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K-State

Kansas
State
University

Graduate
Catalog

1999–2001

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K-State Graduate Catalog 1999–2001

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Naiqian Zhang, Associate Professor, Biological and Agricultural Engineering
R. W. Trewyn, chair (ex officio)

Information

You may call toll-free about admission to graduate study at Kansas State University. Dial 1-800-651-1816. Outside the United States dial 785-532-6191.

Prospective students should contact the Graduate School, Kansas State University, 103 Fairchild Hall, Manhattan, KS 66506–1103.

This catalog is constantly being revised on our web site as new information becomes available. Please refer to the online catalog for the updated version at *http://www.ksu.edu/grad*

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Kansas State University is committed to a policy of nondiscrimination on the basis of race, sex, national origin, disability, religion, age, sexual orientation, or other non-merit reasons, in admissions, educational programs or activities, and employment (including employment of disabled veterans and veterans of the Vietnam Era), all as required by applicable laws and regulations. Responsibility for coordination of compliance efforts and receipt of inquiries, including those concerning Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act, has been delegated to Jane D. Rowlett, Ph.D., Director of Unclassified Affairs and University Compliance, Kansas State University, 111 Anderson Hall, Manhattan, KS 66506–0124 (785-532-4392).

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Kansas State University

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About the Catalog

The Kansas State University *Graduate Catalog* is a reference for those interested in graduate programs of the university. Refer to the table of contents or the index for specific topics of interest.

Degree requirements and programs are organized alphabetically by graduate program. Courses listed in this catalog are those that may be taken for graduate credit.

Notices

Kansas State University reserves the right to make changes in admission requirements, fees, degree requirements, and other rules and guidelines appearing in this catalog. Such changes take precedence over catalog statements. While reasonable effort is made to publicize any changes, the student should remain in close contact with departmental advisors and appropriate offices. Responsibility for complying with all applicable requirements ultimately rests with the student.

Although the university attempts to accommodate the course needs of students, course offerings may be limited by financial, space, and staffing considerations or may otherwise be unavailable. Nothing in this catalog may be construed to promise or guarantee registration in any course or course of study, nor may anything be construed to guarantee completion of an academic program within a specific length of time. Admission to the Graduate School is not complete until application materials have been fully processed and the applicant has been notified in writing of admission.

Student Responsibility

It is the responsibility of students to know and observe all regulations and procedures relating to the program they are pursuing, as well as those of the university and Graduate School. A regulation will not be waived nor an exception granted because students plead ignorance of, or contend that they were not informed of, the regulations or procedures. This catalog, the *Graduate Handbook*, and documents specific to individual graduate programs should be consulted. Questions on regulations and their interpretation pertaining to studies at the graduate level should be addressed to the Graduate School.

Students planning to graduate should become familiar with all pertinent deadlines. (A calendar of deadlines for each semester is available in the Graduate School.) It is necessary to apply for graduation by the specified deadline to graduate in a particular semester, whether or not the student plans to attend the commencement ceremonies.

Contacts

All phone numbers are 785 area code, except where noted. All addresses are Manhattan, Kansas, 66506, except where noted.

Other Publications

Other Kansas State University publications are available on request from the offices listed below.

Graduate School

103 Fairchild Hall, 785-532-6191 or toll-free 1-800-651-1816.

Graduate Studies: an introduction to K-State's graduate programs that includes photos and admission information.

Office of Admissions

119 Anderson Hall, 785-532-6250

K-State Admissions Guide: an introduction to Kansas State University, including photographs and undergraduate application information and forms.

K-State Student Union Bookstore

K-State Student Union, First Floor, 785-532-6583

Class Schedule: a description of the courses offered during an academic semester/session.

K-State Undergraduate Catalog: descriptions of undergraduate programs, courses, and policies.

Kansas State University Graduate Catalog: descriptions of graduate programs, courses, and policies.

About the University

Kansas State University

Kansas State University was founded February 16, 1863, as a land-grant institution under the Morrill Act. Initially located on the grounds of the old Bluemont Central College, chartered in 1858, the university moved to its present site in 1875.

The 664-acre campus is in Manhattan, 125 miles west of Kansas City via Interstate 70 in the rolling Flint Hills of northeast Kansas. The campus is convenient to both business and residential sections of the city. Under an enactment of the 1991 Kansas Legislature, the Salina campus, 70 miles west of Manhattan, was established through a merger of the former Kansas College of Technology with the university.

Additional university sites include 18,000 acres in the four branch locations of the Agricultural Experiment Station (Hays, Garden City, Colby, and Parsons) and 8,600 acres in the Konza Research Prairie jointly operated by the AES and the Division of Biology.

One of the six universities governed by the Kansas Board of Regents, Kansas State University continues to fulfill its historic educational mission in teaching, research, and public service.

Accreditation

Kansas State University is fully accredited by the North Central Accrediting Association and by various professional accrediting agencies. Credit earned at K-State is transferable to other institutions.

Equity in Athletics

In accordance with the Equity in Athletics Disclosure Act, an annual report pertaining to K-State's athletic programs is available to prospective students, students, and the public in the following locations:

Department of Intercollegiate Athletics
Office of Admissions
Office of the Registrar
Dean of Student Life Office
Hale Library

Any questions regarding the Equity in Athletics Disclosure Act should be directed to the Office of Unclassified Affairs and University Compliance, Kansas State University, 112 Anderson Hall, Manhattan, KS 66506–0124.

All-University Regulations

Students, faculty, and administrators are members of a community dedicated to the growth and development of individuals.

Enrollment at K-State entails responsibilities as well as privileges. Acceptance of and adherence to the following policies is necessary for the protection of the rights of others and the protection and health of the community. Copies of the following policies are available in the Student Handbook, Office of Student Activities and Services in the K-State Student Union, and the Office of Student Life in Holton Hall, unless otherwise indicated.

Graduate Student Rights and Responsibilities

1. Every graduate student has:

a. Freedom of inquiry, conscience, expression, and association and the right to petition for the redress of grievances.

b. The right to have any information about his or her opinions and associations unrelated to academic performance or assigned responsibilities that has been acquired by professors or administrators in the course of their work as instructors, advisors, or counselors held confidential at his or her request and not disclosed to others without his or her consent.

c. Freedom from unfair treatment by faculty or administration in the assignment and evaluation of academic work toward the completion of requirements for a particular course.

d. The right to due process in the conduct of proceedings pursuant to the provisions of this document or of any proceedings conducted under any other provisions of any other rule or regulation governing Kansas State University.

e. The right to immunity from reprisal in the form of university disciplinary action or proceedings for seeking redress pursuant to the provisions of this document.

2. Every graduate student is responsible for:

a. The exercise of applicable rights and freedoms, as enumerated above, in a manner that does not materially and substantially interfere with the requirements of appropriate discipline in the operation of the institution or infringe upon the rights of other students.

b. Completing the requirements and meeting the standards of any course in which he or she is enrolled.

Graduate student grievance procedures

If a graduate student feels he or she has been unjustly treated in some aspect of academic work and has been unable to secure a remedy through consultation with the professor(s) involved, with the supervisory committee, and thereafter with the head of the department or chair of the program, it is the student's prerogative to take the matter to the dean of the Graduate School. If the dean is unable to arrive at a mutually acceptable solution with the persons concerned, at the student's request the dean will initiate the grievance procedures adopted by the Graduate Council and described in the *Graduate Handbook*.

Student Conduct

Philosophy of student conduct

The purpose of discipline in the university setting is to educate students about the consequences of their behaviors and to protect the rights and interests of the campus community and its members. Students at K-State are expected to abide by university rules and policies pertaining to non-academic conduct. Persons who violate these rules, disrupt the educational process, or violate laws will be held accountable for their actions in part by the K-State judicial program.

The following principles govern the judicial program: due process will be exercised in all formal hearing procedures to protect the rights of all parties involved; student judicial boards will hear most cases; privacy and confidentiality will be maintained whenever possible; sanctions will be educational in nature; positive outcomes will be sought for all parties. The procedures and regulations for the K-State judicial program are detailed in the Kansas State University Student Governing Association constitution and by-laws and are available free of charge in the Office of Student Activities and Services (OSAS) located on the first floor of the student union.

Prohibited conduct

Important definitions of terms describing prohibited conduct are stated in the K-State SGA constitution and by-laws. These documents should be referenced for additional details on prohibited conduct and student rights. The following described behaviors constitute misconduct for which disciplinary procedures will be implemented and sanctions will be imposed.

1. Acts of dishonesty, including but not limited to the following:

a. Furnishing false information to any university official, faculty/staff member, or office.

b. Forgery, alteration, or misuse of any university document, record or instrument of identification.

c. Tampering with the election of any organization or student governing body.

2. Disruption or obstruction of teaching, research, administration, disciplinary proceedings, other university activities, including its public-service functions on or off campus, or other authorized non-university activities.

3. Conduct that threatens or endangers the mental or physical health or safety of any person, including, but not limited to, physical abuse, verbal abuse, threats, intimidation, harassment, and coercion.

4. Attempted or actual theft of, or damage to, property.

5. Hazing, which is defined as an act which endangers the mental or physical health or safety of a student, or which destroys or removes public or private property, for the purpose of initiation, admission into, affiliation with, or as a condition for continued membership in, a group or organization. Consent by the person hazed shall be no defense to the hazing.

6. Telephone harassment, which shall include:

a. Making calls containing lewd or obscene remarks.

b. Making calls intended to harass whether or not conversation ensues.

c. Making the telephone ring repeatedly with intent to harass.

d. Making repeated calls in which conversation ensues solely to harass.

7. Failure to comply with directions of university officials or law enforcement officers acting in performance of their duties or failure to identify oneself to these persons when requested to do so.

8. Unauthorized possession, duplication or use of keys, or other devices that provide access to any university premises.

9. Unauthorized presence in or use of university premises, facilities, or property.

10. Violation of university policies, rules or regulations

11. Violation of federal, state, or local law.

12. Unauthorized distribution, use or possession of a controlled substance as described in Chapter 65, Article 41 of Kansas Statutes Annotated on university premises or at university sponsored-activities.

13. Unlawful use, possession or distribution of alcoholic beverages or violation of the university's alcoholic beverage policy.

14. Illegal or unauthorized possession or use of firearms, explosives, weapons, or dangerous chemicals on university premises or at a university-sponsored activity.

15. Intentionally initiating or causing to be initiated, any false report, warning or threat of fire, explosion or other emergency on university premises or at a university-sponsored activity.

16. Participation in a campus demonstration which unreasonably disrupts the normal operations of the university and infringes on the rights of other members of the university community; inciting others to disrupt scheduled and/or normal activities within any campus building or area; intentional obstruction which unreasonably interferes with freedom of movement, either pedestrian or vehicular, on campus.

17. Intentionally interfering with the freedom of expression of others on university premises or at a university-sponsored activity.

18. Conduct that is disorderly, lewd, or indecent; breach of peace; or aiding, abetting or procuring another person to breach the peace on university premises or at university-sponsored activities.

19. Any violation of the stated "KSU Information Technology Usage Policies."

20. Abuse of the SGA Judicial Program, including but not limited to:

a. Falsification, distortion, or misrepresentation of information.

b. Disruption or interference with the orderly conduct of a judicial proceeding.

c. Knowingly initiating a complaint without cause.

d. Attempting to discourage an individual's proper participation in, or use of, the judicial system.

e. Attempting to influence the impartiality of a member of a judicial board prior to, or during the course of, the judicial proceeding.

f. Verbal, written, phone, or physical harassment, and/or intimidation of a member of a judicial board.

g. Failure to comply with the sanction(s) imposed under this code.

h. Influencing or attempting to influence another person to commit an abuse of the judicial system.

21. Misconduct may also include any violation of any rules appearing in the leases and contracts entered into by a student to obtain accommodations with the Department of Housing and Dining Services.

Academic Honesty

All academic relationships ought to be governed by a sense of honor, fair play, trust, and a readiness to give appropriate credit for the intellectual endeavors of others when credit is due. K-State's policy on academic dishonesty assures due process and provides guidelines for action in instances where the proper academic relationships and attitudes have broken down.

Any student enrolling at K-State implicitly accepts the university's stipulations concerning academic honesty and the procedures they entail.

Complete copies of the academic dishonesty policy are available from the Office of Student Activities and Servies in the K-State Student Union. The policy outlines grievance procedures for all matters of academic dishonesty, grade appeals, or other academic grievances brought by students against faculty members or faculty members against students.

Plagiarism

Plagiarism, taking someone else's intellectual work and presenting it as your own, covers unpublished and published sources. Borrowing another's term paper, handing in a paper purchased from an individual or agency, or submitting papers from living group, club, or organization files are all punishable as plagiarism. The standard for attribution and acknowledgement of literary indebtedness is set by each discipline. Students should consult with their department or with recognized handbooks in their field if in doubt. The guidelines apply to faculty and research assistants in their possible use of students' and colleagues' research and ideas, as well as to students' use of source materials and authorities, and student use of other students' ideas and work.

Other forms of academic cheating

Other forms of academic dishonesty subject to penalties include, but are not limited to, consultation of books, library materials, or notes during a test; use of crib sheets or hidden notes during an examination or looking at another student's test; having a confederate supply questions or answers from an examination to be given or in progress; having another person stand in on an exam or other graded activity; deliberate falsification of lab results; submission of falsified data; procurement or alteration, without permission, of examinations or other academic exercises; collaborating on projects where collaboration is forbidden; and other forms of academic dishonesty and fraud.

Adjudication and penalties

Guidelines for adjudicating charges of dishonesty are described in the policy. Further information is contained in the Faculty Senate minutes, April 11, 1989, Student Grievance Procedures.

The minimum penalty for cheating on an examination or paper, if proved, is an F for the assignment; maximum penalty is dismissal from the university. Minimum penalty for cheating on a comprehensive final, if proved, is an F for the course; maximum penalty is dismissal from the university.

In a second proved instance of academic dishonesty, suspension from the university is automatic. Dismissal from the university is the maximum penalty.

University Policies

Students, faculty, and administrators are members of a community dedicated to the growth and development of individuals. Enrollment at K-State entails responsibilities as well as privileges. Acceptance of and adherence to the following policies is necessary for the protection of the rights of others and the protection and health of the community. Copies of the following policies are available in the Student Activities and Services Office in the K-State Union and the Dean of Student Life Office in Holton Hall, unless otherwise indicated.

Advertising, sales, and solicitation

Facilities of Kansas State University are not available for unrestricted use by non-university groups. University property may not be used for commercial purposes except when sponsored by a university-affiliated organization or department. The regulations governing fund-raising and the posting and distribution of literature are available in the Office of Student Activities and Services.

AIDS, ARC, and HIV virus guidelines

Under the direction of the Kansas Board of Regents, the university has developed guidelines to assist students, staff, and faculty members in the event that they have to deal with situations involving acquired immune deficiency syndrome (AIDS), HIV, or AIDS-related complex (ARC). Complete copies of the guidelines are available in the Lafene Health Center.

Alcohol and cereal malt beverage policy

The legal drinking age in Kansas for alcoholic beverages is 21. The Kansas Board of Regents policy permits the use and sale of cereal malt beverages (3.2 beer) under authorized and appropriately controlled conditions and regulations. By state law, the sale of alcoholic liquor is not permitted on state property. Included in the K-State policy is information on alcohol and cereal malt beverage consumption in residence halls, at athletic events, and for student organizations.

Drug-free workplace policy

In 1988, Congress passed the Drug-Free Workplace Act. This act applies to all institutions holding and applying for federal grants and contracts. K-State adopted the policy that the unlawful manufacture, distribution, dispensing, possession, or use of controlled substances is prohibited in its workplace.

Facilities usage

K-State facilities are available for use by authorized groups for activities that complement the teaching, research, and service programs of the university. Policies and procedures for use of K-State facilities (other than the K-State Student Union) are available in the Division of Facilities Management in Dykstra Hall. Policies and procedures for use of the K-State Student Union are available in the Union Reservations Office on the second floor or in the *Handbook for Registered Student Organizations*.

Gender

The goal of this policy is to create an environment in which all students, faculty, and staff interact solely on the basis of individual strengths and characteristics without having those interactions shaped by generalizations, stereotypes, or valuations based on gender. Copies are available in the Women's Center in Holton Hall and Affirmative Action Office in Anderson Hall.

Political activity guidelines

All members of the university community are encouraged to take advantage of opportunities to educate themselves regarding the candidates and issues relating to national, state, and local elections. Copies of the university guidelines related to political activities on campus are available in the Office of Student Activities and Services.

Prayer at university functions

Nonsectarian prayers, invocations, benedictions, or silent meditations are permitted at university functions to enhance mutual respect and awareness.

Racial and/or ethnic harassment

Racial and/or ethnic harassment is prohibited by K-State and includes, but is not limited to, verbal, physical, or written behavior directed toward or relating to an individual or group on the basis of race, ethnicity, or racial affiliation. It has the purpose or effect of creating an intimidating, hostile, or offensive work or educational environment; interfering with an individual's work, academic performance, living environment, personal security, or participation in any university-sponsored activities; and threatening an individual's employment or academic opportunities.

Racial and/or ethnic harassment should be reported to the university administrator responsible for the department or unit or to the Affirmative Action Office. For students with complaints of harassment by other students, the dean or associate dean of student life may be regarded as the appropriate administrator. Copies of the policy are available from the Affirmative Action Office in Anderson Hall.

Religious activities

In a pluralistic, multicultural, and interdenominational university environment, freedom of worship is supported. Religious programs and activities must comply with university policies as well as federal, state, and local laws. In keeping with its education mission, the university may specify the time, place, and manner of religious events, but may not regulate their content.

Sexual harassment policy

K-State prohibits sexual harassment and has defined sexual harassment as any behavior that, through inappropriate sexual content or disparagement of members of one sex, interferes with an individual's work or learning environment. This policy applies to the working and learning relationships of all individuals within the university community, including faculty, staff, and students.

Sexual harassment should be reported to the university administrator responsible for the department or unit or to the Affirmative Action Office. For students with complaints of harassment by other students, the Dean of Student Life may be regarded as the responsible administrator. Copies of the Policy Prohibiting Sexual Harassment are available from the Office of Student Activities and Services, departmental offices, or the Affirmative Action Office in Anderson Hall.

Sexual violence

No form of sexual violence will be tolerated or condoned at Kansas State University. This policy prohibits not only those acts commonly understood to constitute "sexual assault," but all attempts to coerce sexual activity as well. The university will investigate acts of sexual violence perpetrated by and/or against students and will respond with appropriate action, which may include suspension or dismissal. Copies of the policy are available in the Women's Center in Holton Hall or the Office of Student Life.

Calendar

Fall Semester 1999

August 23
Semester begins.

September 6
University holiday.

November 24–28
Student holiday.

November 25–26
University holiday.

December 10
Last day of semester.
Commencement.

December 13–17
Semester examinations.

Spring Semester 2000

December 27
January intersession through January 12.

January 1, 1999
University holiday.

January 13
Semester begins.

January 17
University holiday.

March 20–26
Student holiday.

May 5
Last day of semester.

May 8–12
Semester examinations.

May 12–13
Commencement.

Summer Semester 2000

May 15
May intersession through June 2.

May 16
Session I—first day of classes.

May 29
University holiday.

June 6
Session II—classes begin.

June 23
Session I—last day of classes.

June 27
Session III—classes begin.

July 4
University holiday.

July 28
Session II—last day of classes.

July 31
August intersession through August 18.

August 4
Session III—last day of classes.

Fall Semester 2000

August 21
Semester begins.

September 4
University holiday.

November 22–26
Student holiday.

November 23–24
University holiday.

December 8
Last day of semester.
Commencement.

December 11–15
Semester examinations.

Spring Semester 2001

December 27
January intersession through January 10.

January 11
Semester begins.

January 15
University holiday.

March 19–25
Student holiday.

May 4
Last day of semester.

May 7–11
Semester examinations.

May 11–12
Commencement.

Summer Semester 2001

May 14
May intersession through June 1.

May 15
Session I—first day of classes.

May 28
University holiday.

June 5
Session II—first day of classes.

June 22
Session I—last day classes.

June 26
Session III—first day of classes.

July 4
University holiday.

July 27
Session II—last day of classes.

July 30
August intersession through August 17.

August 3
Session III—last day of classes.

Graduate Study

With 65 master's programs and 43 doctoral programs, Kansas State University offers preparation for a variety of scholarly and research careers as well as for a wide range of professional positions. Since research is the mode of learning at the limits of knowledge, a common objective of all the graduate programs is to develop the capacities needed for independent study and research. All doctoral programs and most master's programs develop such capacities through both advanced course work and original research under the direction of faculty members who are experts in their fields.

A crucial part of the process involves the preparation and publication of a research study in the form of a thesis or dissertation and a defense of the study before the faculty. Some professional master's programs emphasize preparation for professional practice and consequently offer a nonthesis option, but in these, too, the student should gain a thorough understanding of research and research methodology.

Graduate Faculty

The graduate faculty conduct the graduate degree programs of Kansas State University. Graduate faculty membership is granted by the graduate dean on the recommendation of the Graduate Council based on the candidate's demonstrated independence as a scholar, expertise in the field, and ability to make significant contributions to the body of knowledge in his or her discipline.

Graduate faculty serve as advisors and mentors for graduate students, teach graduate-level courses and participate in the governance process for graduate education throughout the university. In this catalog, members of the graduate faculty are listed in each graduate program in which they participate as well as in an alphabetical listing in the last section of the catalog.

Graduate Council

The Graduate Council is the chief legislative and policy-formulating body of the graduate faculty. Presided over by the graduate dean and made up of elected graduate faculty from across the university, it formulates policies governing the conduct of graduate study at Kansas State University. The graduate faculty delegates to the Graduate Council its authorities over graduate faculty appointments, graduate courses and curricula, and graduate degree standards and requirements. Policies developed by the council are contained in the *Graduate Handbook* and form the framework for policies which may be developed by individual graduate programs.

Master's Degrees

Master of science
Adult, occupational, and continuing education
Agricultural economics
Agronomy
Anatomy and physiology
Animal science
Apparel and textiles
Architectural engineering
Biochemistry
Biological and agricultural engineering
Biology
Chemical engineering
Chemistry
Civil engineering
Clinical sciences
Computer science
Educational administration
Electrical and computer engineering
Elementary education
Entomology
Family studies and human services
Food science
Food service and hospitality management and dietetics administration
Foods and nutrition
Genetics
Geology
Grain science
Horticulture
Industrial engineering
Kinesiology
Mass communications
Mathematics
Mechanical engineering
Microbiology
Nuclear engineering
Operations research (see industrial and manufacturing engineering)
Pathobiology
Physics
Plant pathology
Psychology
Secondary education
Special education
Statistics
Student counseling and personnel services
Veterinary anatomy and physiology (see anatomy and physiology)
Veterinary clinical sciences (see clinical sciences)
Veterinary pathology (see pathology)

Master of arts
Economics
English
Environmental planning and management
Geography
History
Modern languages
Political science
Sociology
Speech
Theatre (see speech)

Master of accountancy
Master of agribusiness
Master of architecture
Master of business administration
Master of engineering management
Master of fine arts
Master of landscape architecture
Master of music
Master of public administration
Master of regional and community planning
Master of software engineering

Doctoral Degrees

Doctor of education
Adult, occupational, and continuing education
Curriculum and instruction
Educational administration
Educational psychology
Special education
Student counseling and personnel services

Doctor of philosophy
Adult, occupational, and continuing education
Agronomy
Animal science
Biochemistry
Biology
Chemistry
Computer science
Curriculum and instruction
Economics
  Agricultural economics
  General economics
Engineering
  Biological and agricultural engineering
  Chemical engineering
  Civil engineering
  Electrical and computer engineering
  Industrial engineering
  Mechanical engineering
  Nuclear engineering
Entomology
Food science
Foods and nutrition
Genetics
Geography
Geology (cooperative with University of Kansas)

Grain science
History
Horticulture
Human ecology
  Apparel and textiles
  Family life education and consultation
  Foodservice and hospitality management
  Life span human development
  Marriage and family therapy
Mathematics
Microbiology (see biology)
Physics
Plant pathology
Psychology
Sociology
Statistics
Student counseling and personnel services
Veterinary pathobiology (see pathobiology)
Veterinary physiology (see anatomy and physiology)

International Programs

William L. Richter, Associate Provost
for International Programs
Connie Noble, Office Specialist
Office of International Programs
304 Fairchild Hall
785-532-5990
Fax: 785-532-6550
E-mail: oip@ksu.edu
Home page: http://www.ksu.edu/oip/

Building upon several decades of international involvement, K-State provides a range of programs that link the campus with other parts of the world.

The Office of International Programs, directed by the associate provost for international programs, is responsible for university-wide coordination of international activities and general enhancement of K-State's global roles. The Office of International Programs supervises study abroad and the English Language Program, and works closely with the International Student Center, International and Area Studies, and other university and college programs. An international activities council, with representation from all of the colleges, provides ongoing strategic planning, program review, and policy guidance.

International Activities Council

Dr. Enid Cocke, Chair
205 Fairchild Hall
785-532-7324
Fax: 785-532-6550
E-mail: ecocke@ksu.edu

The International Activities Council is composed of faculty and administrators from throughout K-State. IAC meets regularly, usually on a monthly basis, to promote and support international activities at K-State, and to enhance the internationalization of the university's activities.

English Language Program

Mary Wood, Interim Director
English Language Program
205 Fairchild
Phone: 785-532-7324
Fax: 785-532-6550
E-mail: elp@ksu.edu
Home page: http://www.ksu.edu/elp

The English Language Program offers intensive English courses primarily for international students who plan to enter degree programs at K-State. However, it also accepts students who wish to come for English instruction only.

The program offers four levels of full-time intensive English. It also offers an advanced part-time course specifically for graduate students. This course provides continued instruction and support in English while students take up to six hours in their degree field.

Many graduate departments offer conditional admission to students who are academically qualified but do not yet have the necessary English proficiency. These students then apply to the English Language Program and receive an I-20 form to cover both their English study and the time that they spend earning their degree. They study in the English Language Program until they receive the necessary TOEFL score or earn the recommendation of the program.

The program also screens the English proficiency of incoming non-native speakers of English. Students with a TOEFL between 550 and 600 are tested, and some, depending on their test results, may be required to take some English courses. In addition, the English Language Program administers the oral proficiency test for students who wish to qualify to be graduate teaching assistants.

For other information and a brochure, write the English Language Program at the address above.

International and Area Studies Programs

Dr. Bradley Shaw, Director
215 Eisenhower Hall
785-532-1988
Fax: 785-532-7004
E-mail: bradshaw@ksu.edu

Students interested in world affairs may take advantage of several interdisciplinary opportunities. The Latin American studies and international studies programs offer secondary majors to undergraduates. International trade studies provides an area emphasis for graduate students.

Several other international programs do not offer degrees but provide advice and opportunities to interested students and faculty. These include the South Asia Center, the Canadian studies program, and groups of scholars with interests in the Middle East, Western Europe, Eastern and Central Europe, and Africa. Formore information, contact the following:

African studies
Donald Adamchek, 785-532-6865

Canadian studies
Judith Zivanovic, 785-532-6895

International trade studies
Mark Parillo, 785-532-0374

Middle East studies
Michael Suleiman, 785-532-6842

Russian studies
Walter Kolonosky, 785-532-6760

South Asian studies
Bimal Paul, 785-532-6727

Study Abroad Programs

Barry Michie, Director
304 Fairchild Hall
785-532-5990 or 532-1698
E-mail: sikarraj@ksu.edu

The Study Abroad Program provides information for students who wish to study in another country. K-State has bilateral exchange agreements with more than two dozen universities abroad. In addition, the university participates in the International Student Exchange Program (ISEP), and other consortial arrangements through which other exchanges are possible.

Qualified students are encouraged to apply for Rhodes, Marshall, Fulbright, Rotary, and other international scholarships.

Bi-lateral programs

Australia
Deakin University

China (People's Republic of)
Henan Agricultural University, Zhengzhou
Luoyang Institute of Technology
Xiangtan University
Hunan Zhengzhou Grain College

Costa Rica
University of Costa Rica
Institute of Technology of Costa Rica

Czech Republic
Charles University, Prague
Czech Technical University, Prague

Denmark
Aarhus School of Architecture
University of Copenhagen

France
Aix-Marseille University
Blaise-Pascal University, Clermont-Ferrand
Ecole Superiere d'Agriculture de Purpan
Institute National Polytechnique de Lorraine, Nancy

Germany
European University Viadrina
Justus Liebig Universitat, Giessen
Leipzig Graduate School of Management
Ludwig Maximilian Universitat, Munich

Honduras, Tegucigalpa
Pan American Agricultural College–El Zamorano
Ministry of Natural Resources

Korea (Republic of)
Korea University

Mexico
Instituto Technologico y de Estudios de Monterry (ITESM)

The Netherlands
Agricultural University of Wageningen
Maastricht University

New Zealand
University of Otago, Dunedin

Paraguay, Asuncion
National University
Catholic University

Russia
Agricultural Academy of Sciences
Moscow Academy of Applied Biotechnology
Moscow State University
Novosibirsk State University
Voronezh State Pedagogical University
Voronezh State Academy of Technology
Voronezh State University

South Africa
Port Elizabeth Technikon
University of Port Elizabeth

Switzerland
Eidgenossische Technische Hochschule, Zurich (ETH)

United Kingdom
Norwich Institute of Art and Design
Nottingham University
University of Sunderland
Glasgow School of Art and Design

Consortial and other multi-institutional programs

International Student Exchange Program (ISEP)
Links with 100 plus universities in Europe, Africa, Asia, the Pacific, Indian Ocean, Canada, and Latin America.

Nakajo, Japan
SIU-Carbondale (MAUI)
Study Abroad, 785-532-5990

MAUI-Utrecht Program
Links with twenty six universities across Norway, Sweden, Denmark, Netherlands, Germany, United Kingdom, Ireland, France, Spain, Portugal, Italy, Greece, Slovenia, Czech Republic, and Estonia.

Group study programs

Group study abroad
Elfrieda Nafziger, Coordinator;
785-532-5990; fax: 785-532-6550

Architecture international studies program
Susanne Siepl-Coates, Director;
785-532-1122; fax: 785-532-6722

Mexican summer program
Maureen Ihrie, 785-532-6760

Scholarship programs for foreign study

Fulbright
Walter Kolonosky, 785-532-6760

Marshall, Rhodes
Elizabeth Powers, 785-532-6900

Partnership exchange (Germany/Switzerland)
Study Abroad, 785-532-5990
Carol Miller, 785-532-6760

Pearson Fellowship
Study Abroad, 785-532-5990

Rotary International
Jerry Weis, 785-532-6615

Vernon Larson Study Abroad Scholarship

Corliss Lamont Humanist Community Service Program

Joseph and Elizabeth Barton-Dobenin International Exchange Scholarship

Heather Stewart Memorial Scholarship

Doris Hays Fenton Memorial Scholarship
Study Abroad, 785-532-5990

Marc Johnson International Studies Scholarship
Larry Erpelding, 785-532-6151

Yamani (Middle East)
Michael Suleiman, 785-532-6842

International Development Programs

Mid-America Universities International Council (MAUI)
William L. Richter, 785-532-5990

Food and Feed Grains Institute
Roe Borsdorf, Interim Director, 785-532-4056

International Agricultural Programs
Robert Hudgens, Director
105D Waters Hall
785-532-7034
http://www.oznet.ksu.edu/dp_iap
Since 1956, K-State has been engaged in technical assistance projects, collaborative research, and educational programs to promote agricultural development throughout the world. With funding through USAID, K-State faculty have been involved in long-term projects in India, Nigeria, the Philippines, Botswana, Honduras, and Pakistan to strengthen agricultural research and extension in universities and government ministries. As a member of the Mid-America International Agricultural Consortium (MIAC) and

Collaborative Research Support Projects dealing with agribusiness and sorphum/millet research, faculty have also participated in projects in Peru, Morocco, Liberia, Egypt, Tunisia, and Kenya. In 1997, International Agricultural Programs was reorganized to more actively support the globalization of the resident education, agricultural research, and outreach services of the College of Agriculture. As a result, the office now provides a range of potential international experiences for faculty, undergraduates, and graduate students. These include study tours, summer internships, and scholarships for students, as well as faculty sabbatical exchanges, collaborative research, and participation in international conferences. In addition to supervising international visitors and sponsored international students, the office maintains strategic linkages with universities and research institutions in other countries and actively markets the academic degree programs and international services of the College of Agriculture, particularly those offered through the International Grains Program, International Meat and Livestock Program, Information Services to Support Agriculture, and the Food and Feed Grains Institute.

International Business Consortium
Yar Ebadi, 785-532-7351

International Community Service Program
Carol Peak, Director, 785-532-5701
http://www.ksu.edu/csp

International Grains Program
John Howard, Director, 785-532-4071
http://www.oznet.ksu.edu/dp_grsi/igp/welcome.htm

International Meat and Livestock Program
Janice Swanson, Director, 785-532-6533
http://www.oznet.ksu.edu/pr_imlp/imlp_welcome.htm

International Sorghum and Millet Program (INTSORMIL)
Robert Hudgens, 785-532-7034
http://www.ianr.unl.edu/intsormil/index.htm

International Trade Studies
Mark Parillo, 785-532-6730

Kansas–Paraguay Partners
Frank Morrison, 785-532-1443

Mid-America International Agricultural Consortium (MIAC)
Robert Hudgens, 785-532-7034
http://www.miac.org/

Paraguay Project
Barbara Stowe, 785-532-5500

Information Support Services for Agriculture (ISSA)
Donna Schenck-Hamlin, 785-532-7452
http://www.lib.ksu.edu/depts/issa/

Wheat Genetics Resource Center
Bikram Gill, 785-532-6176
http://www.ksu.edu/wgrc

Student Records

University Policy

Kansas State University maintains various student records to document academic progress and to record interactions with university staff and officials. To protect each student's rights to privacy and to conform with federal law, the university has an established policy for handling student records.

Interpretation of this policy is based on experience with educational records, and the policy itself may subsequently be modified in light of this experience. Notice of the policy and of a student's rights under federal law is given annually. Copies of this policy are available at the Registrar's Office, 118 Anderson Hall and stated below.

Directory Information

Certain information concerning students is considered to be open to the public upon inquiry. This public information is called directory information and includes a student's name, local address and telephone number, permanent mailing address, college, curriculum, year in school, date and place of birth, dates of attendance at K-State, awards and academic honors, degrees and dates awarded, most recent educational institution attended, participation in officially recognized activities and sports, and height and weight of members of athletic teams.

Directory information as defined above will be released for individual students by the Registrar's Office to anyone upon inquiry, unless the student has requested each semester after enrolling that directory information not be released. The student's request to have directory information withheld from the campus directory (published fall semester) must be submitted for each semester the student is enrolled and should be made at the Registrar's Office, which will notify other appropriate university offices.

Confidential Information

With the exception of the information noted above, student records are generally considered to be confidential. The following policies govern access to confidential student records:

1. Each type of student record is the responsibility of a designated university official, and only that person or the dean, director, or vice president to whom that person reports has authority to release the record. The responsible officials are:

a. Academic records: For graduate students, the Graduate School, Fairchild Hall and the Registrar's Office, Anderson Hall.

b. Admissions records: For graduate students, the Graduate School, Fairchild Hall.

c. Financial aid records: director of Student Financial Assistance, Fairchild Hall.

d. Business records: Controller's Office, Anderson Hall.

e. Security/police records: head of the University Police Department, Edwards Hall.

f. Medical records: director of the Student Health Service, Lafene Health Center.

g. Counseling records: director of University Counseling Services, Lafene Health Center.

h. Actions of academic standards committees: college dean.

i. Academic disciplinary records: the Graduate School, Fairchild Hall.

j. Nonacademic disciplinary records: dean of student life, Holton Hall.

k. Housing records: director of housing and dining services, Pittman Building.

l. Placement records: director of Career Planning and Placement Center, Holtz Hall.

m. Evaluations for admission to graduate or professional programs: dean (of the Graduate School or the appropriate college) or department head.

n. Special academic programs: faculty member in charge of the program, and dean of the college.

o. Foreign student records: foreign student advisor, International Student Center.

p. Test scores for College Level Examination Program (CLEP), American College Testing Program (ACT), Miller Analogies Test (MAT), etc.: director, Academic Assistance Center, Holton Hall.

2. Confidential educational records and personally identifiable information from those records will not be released without the written consent of the student involved, except to other university personnel, or in connection with the student's application for financial aid, or in response to a judicial order or subpoena, or in a bona fide health or safety emergency; or, upon request, to other schools in which the student seeks or intends to enroll; or to the U.S. comptroller general, the secre-

tary of H.E.W., the U.S. commissioner of education, the director of the National Institute of Education, the assistant secretary for education, state educational authorities, or state and local officials where required by state statute adopted before November 19, 1974.

3. The responsible official may release records to university personnel who have a legitimate need for the information in order to carry out their responsibilities.

4. All student records are reviewed periodically. Information concerning the frequency of review and expurgation of specific records is available in the Registrar's Office.

5. With certain exceptions, students may review records that pertain directly to them upon request and may obtain a copy of the record at cost, according to the following schedule:

a. Transcript of academic record: $5 per copy

b. Housing department records: five cents per page

c. Medical records (Lafene Health Center): no charge to patient for medical purposes. A minimum charge of $15 to outside parties with patient release

d. Other records: no charge.

The major exceptions to student review are medical and counseling records. These may be released, however, to other medical or psychological professionals at the written request of the student; and may be inspected by the patient at the discretion of the professional staff. Other exceptions are law enforcement records, private notes of staff members, and financial records of parents.

6. A student may waive the right to review a specific record by submitting in writing a statement to this effect to the official responsible for that record. Examples are recommendations for career placement or admission to graduate study.

7. University personnel who have access to student educational records in the course of carrying out their university responsibilities shall not be permitted to release the record to persons outside the university, unless authorized in writing by the student or as required by a court order. Only the official responsible for the records has the authority to release them.

8. All personal educational information about a student released to a third party will be transferred on condition that no one else shall have access to it except with the student's consent. A record is maintained showing who has had access to student records, and this record is open to inspection by the student.

Release of Grades

Reports of a student's grades are routinely sent to the student. Parents of dependent students may obtain grades by writing to the Registrar's Office. Proof of dependency is required. The grades of other students will be sent to their parents only with written permission of the student.

Withholding records

In the case of a student who is delinquent in an account to the university or about whom official academic and/or disciplinary action has been taken, the appropriate university official may request that the student's record not be released. The effect of this action is that transcripts, registration forms and diplomas are withheld as well as the process of dropping or adding a course. In order for the action to be rescinded, the Registrar's Office must receive authorization from the official who originally requested the action, indicating that the student has met the obligation. Further information concerning this policy can be obtained from the Registrar's Office, 118 Anderson Hall, 532-6254.

Review and Challenge of Records

Upon request to the official listed above, a record covered by the act will be made available to the student within a reasonable time and no later than 45 days after the request. Copies are available at the student's expense and explanations and interpretations of the records may be requested from the official in charge. If the official believes that a particular record or file contains inaccurate or misleading information or is otherwise inappropriate the university will afford an opportunity for a hearing to challenge the record's content. Prior to any formal hearing, the official in charge of the record is authorized to attempt, through informal meetings and discussions with the student, to settle the dispute. If this is unsuccessful, the matter will be referred to the appropriate vice president.

If the student is still dissatisfied, a hearing may be requested. The hearing, conducted by a hearing officer appointed by the president, will be held within two weeks. The student will have the opportunity at the hearing to present any relevant evidence, and a decision will be rendered within two weeks after the hearing. If the result does not satisfy the student, he or she may place a statement in the file.

Complaints

A student who believes the university has not complied with federal law or regulations may send a written complaint to The Family Educational Rights and Privacy Act Office, 400 Maryland Avenue, S.W., Washington, D.C. 20202.

Transcripts

A transcript is a certified, official copy of a student's permanent academic record. Since the transcript contains confidential information, it cannot be released to anyone other than the student except as follows: if a specific signed request by the student for release to another party or a release in compliance of federal regulations is submitted.

The prepaid fee for a transcript is $5. Payment, in advance, can be made by cash, check, money order (make checks and money orders payable to Kansas State University), VISA or MasterCard. A request for a transcript must be made through the Registrar's Office, 118 Anderson Hall, Manhattan, KS 66506-0114. The telephone number is 785-532-6254. Transcript service will not be provided for a student who has outstanding financial obligations.

The transcript request must include the following:

1. Student's current name, plus any other name or names used while attending K-State.

2. Student's I.D. number (social security number).

3. Student's date of birth.

4. Student's beginning and ending dates of attendance at K-State.

5. The number of transcripts requested.

6. Where the transcript is to be sent.

7. Transcript fee: $5 per copy, plus additional mail/fax service if requested.

8. Student's original signature.

9. Student's current home address and daytime telephone number.

10. If transcript is to be held for current semester grade/degree, indicate on request.

11. Fax requests require MasterCard/VISA card number and expiration date.

Transcripts picked up by or sent to the student are stamped "issued to student" and are not accepted as official by some institutions.

Admission

Correspondence regarding admission to the Graduate School should be addressed to the appropriate graduate program, which will supply application blanks and supplementary information.

Admission to graduate study is granted by the dean of the Graduate School only upon the recommendation of the faculty in a graduate program. Applicants should see that each undergraduate or graduate institution previously attended sends official transcripts. The transcripts should be received by the program as soon as possible but no later than three months before the time the student expects to enroll. All transcripts become part of the student's official file and may not be returned.

International applicants must submit with their application an international cashier's check or money order in the amount of $25 payable to the Kansas State University Graduate School. International applications without this fee will not be processed.

Applicants who wish to be considered for graduate assistantships or other funding should normally have all materials on file by February 1 for highest priority consideration, although some programs have later deadlines.

Entrance Requirements

Admission with full standing

An application for admission to the Graduate School ordinarily implies the student's intention to work toward an advanced degree. To be considered for admission with full standing the applicant must have:

- A bachelor's degree from an institution accredited by one of the regional accrediting associations.
- Adequate undergraduate preparation in the proposed major field or equivalent evidence of an appropriate background for undertaking an advanced degree program.
- An undergraduate average of B or better in the junior and senior years.

Individual graduate programs may have additional admission requirements. Prospective applicants should consult the appropriate program entry in this Catalog or contact the program directly.

Applicants to the Graduate School at K-State must have a bachelor's degree substantially the same as the ones granted by K-State. These degrees regularly contain a broad range of courses representing the basic academic disciplines. In addition, a major portion of the courses included should be graded by a multilevel system, usually A, B, C, D, and F.

Applicants holding degrees not meeting these standards may be denied admission to graduate degree programs at K-State. Admission will be denied to applicants possessing bachelor's degrees with a significant amount of credit awarded for work experience that was not supervised by a faculty member of an accredited university nor evaluated in units which identify the academic content. However, a limited amount of credit for experience, when awarded as an acceptable part of a bachelor's degree for internships, field experience, or the like, will not be cause for denial of admission, but it must be clearly delineated as graded work.

Probationary admission

For those whose grades do not meet the above standards, probationary admission may be granted, provided there is other evidence that the applicant has the ability to do satisfactory graduate work. Such evidence might include an excellent record of postgraduate work at another institution, or high scores on the Graduate Record Examination or the Miller Analogies Test. Those who wish to take the Graduate Record Examination should obtain the *GRE Information and Registration Bulletin*, available at most university and college testing offices. The fee for either test must be paid by the applicant.

Provisional admission

Students may be admitted provisionally if there is uncertainty in evaluating transcripts, or if there are undergraduate deficiencies which must be removed.

Students admitted on probation or provisionally will be advised of other conditions to be met to attain full standing. Full standing is attained automatically upon completion of at least 9 hours of course work for graduate credit with a grade of B or better, and upon the removal of any deficiency which was specified at the time of the admission. Students admitted on probation may be denied continued enrollment if they do not achieve full standing within the specified time period.

Nondegree graduate students

Students who do not plan to work for an advanced degree may be admitted to the Graduate School as non-degree students. Applications from such students should be sent to the program in which they plan to take courses together with a copy of the official transcript from the institution which granted the undergraduate degree. A nondegree seeking student who later wishes to enter a degree program must undergo the full application and admission review process. No more than 9 semester hours earned as a nondegree student may be transferred into a regular degree program.

In all cases, applications are initially reviewed by the program, which forwards to the Graduate School those recommended for admission. Students are admitted officially only by the Graduate School.

Standardized Tests

If your graduate program requires standardized tests, you should request the Educational Testing Service to send your scores to Kansas State University. If you indicated where you wanted your scores sent (the academic department and Kansas State University) when you took the test, your scores will automatically be sent. The Graduate School does not accept photocopies as official for admission purposes. Standardized test scores are valid for five years. (If available, please include test scores on the application.)

Primary Language

To demonstrate competence in the English language, an official report of scores on the Test of English as a Foreign Language (TOEFL) must be sent to Kansas State University for all applicants whose primary language is not English. The TOEFL is offered throughout the world by the Educational Testing Service, Princeton, New Jersey 08540, USA. Those who have received a degree in the last two years from a United States college or university are not required to submit a TOEFL score but must take an English proficiency test upon arrival at Kansas State University.

A score of at least 550 (213 on the computer-based test) on the TOEFL is required to be considered for admission to the Graduate School. (NOTE: Some programs require a TOEFL score higher than stated here.) Applicants with scores of 600/250 or above may be considered for regular admission. Applicants with scores between 550/213 and 599/249 may be admitted provisionally and must at the time of their enrollment demonstrate proficiency in reading and writing English and in understanding spoken American English to the satisfaction of the Graduate School. Those who do not meet the minimum proficiency standard will be required to complete specified courses offered by the English

Language Program (ELP) at K-State. Intensive English training for students who have TOEFL scores below 550/213 is also available through the ELP. For information and application to this program write to Director, English Language Program, 205A Fairchild Hall, Kansas State University, Manhattan, Kansas 66506-1106; e-mail: *elp@ksu.edu*.

International Students

International applicants for admission to Kansas State University must meet the same academic standards for admission as those required of native students. In addition, international applicants holding nonimmigrant visas are required by U.S. immigration regulations to be enrolled in a full course of study. University regulations require that international students and their dependents (if they are with the student) purchase or be in possession of a medical insurance policy or equivalent coverage. Medical insurance can be purchased on the campus or from other independent agencies.

Applications from international students must be accompanied by an international cashier's check or money order in the amount of $25 payable to the Kansas State University Graduate School. Applications without this fee will not be processed.

A special orientation and advising program is conducted for new international students one week before the date of enrollment.

Graduate school application
http://www.ksu.edu/grad/applicat.htm

Enrollment

Donald E. Foster, University Registrar
118 Anderson Hall
785-532-6254

Enrollments for fall, spring and summer semesters, and January, May, and August intersessions occur at specified times during the academic year. The specific times are outlined in the *Course Schedule*, a booklet published by the Registrar's Office, or in a similar pamphlet published by the Division of Continuing Education.

Assignment to Courses

Students are responsible for fulfilling all requirements of the curriculum in which they are enrolled. They should consult with their advisors and be familiar with the Kansas State University *Graduate Catalog*. A catalog is given to each new student and copies are maintained for student use in the Graduate School, all deans' offices, Hale Library, and all departmental offices. Catalogs may also be purchased at the K-State Student Union Bookstore.

No student is officially enrolled in courses or for private lessons in music or other subjects until a formal course assignment is completed. No more than 16 credit hours, including those obtained in research, may be assigned in a single semester, nor more than 9 credit hours during a summer semester. If a part of the assignment is for undergraduate credit, a student may be assigned to 17 hours during a semester or 10 hours during a summer semester. Full-time staff members of the university may not be assigned to more than 6 hours in one semester, nor more than 3 hours in a summer semester, and may enroll only with the permission of their supervisors. (See section on assistantships and fellowships for limitations applying to students holding assistantships.) These limitations apply to courses audited as well as courses for which credit is earned.

Course schedule changes processed after deadlines dates must be accompanied by the approval of the student's advisor, the instructors, and the dean of the Graduate School.

All graduate students who have matriculated at Kansas State University and are using faculty time and/or university facilities for research or other academic pursuits must be enrolled. The enrollment should reflect, as accurately as possible, the demands made on faculty time and use made of university facilities. Further, a graduate degree candidate must be enrolled during the semester in which the requirements for a degree are completed.

A student working for the Ph.D. must enroll during the semester in which the preliminary examination is taken and subsequently in each semester (summer semesters excepted) until the degree requirements are satisfied and the dissertation is accepted by the Graduate School. Failure to enroll will result in loss of candidacy. To regain candidacy, the student will be re-examined over the areas covered in his or her preliminary examinations in a manner to be determined by the supervisory committee.

If it is necessary to interrupt progress toward the degree after the preliminary examination has been passed, the student (or the major professor) may petition for leave of absence for up to one year which subsequently may be renewed. Renewals for those who are meeting a military service requirement will be automatic. The petition must be submitted at least one month before the effective date of leave. Approval must be granted by the major professor, chair of the department or graduate program, and the dean of the Graduate School.

Upon written notification, doctoral candidates, who have passed preliminary examinations and do not live in a 30-mile radius of Manhattan, may request the Graduate School to send enrollment information prior to an enrollment period. Candidates may then enroll themselves by telephone or by computer via the World Wide Web through the K-State Access Technology System (KATS). KATS can be accessed directly from the K-State home page.

Faculty and Employees

Full-time faculty members and regular employees, with approval of the department heads or deans, may enroll in graduate or undergraduate work not to exceed 6 credit hours in fall and spring semesters or 3 credit hours during the summer semester.

Late Enrollment

A student who seeks to enter the university later than 10 calendar days after the start of the semester may be admitted only by special permission of the dean of the Graduate School. Those who enroll after the regular registration period pay a special handling fee of $50.

Withdrawal from the University

A student who withdraws from the university must obtain an official withdrawal permit from the graduate dean.

If a student withdraws during the first 25 days of the semester, no mark will be recorded on the student's transcript; thereafter, a mark of W is recorded. The deadline for withdrawing is the end of the 10th week of the fall or spring semester or end of the 5th week for session I, II, or III of the summer semeters. If a student finds it necessary to withdraw from the university for verifiable nonacademic reasons after the 10th week (or 5th week, summer semester), he or she should consult the dean's office.

Auditing Courses

Auditing is attending a class regularly, without participating in course work or receiving credit, and is permitted on a space-available basis. Permission to audit a course is granted by the instructor, with the approval of the dean of the college in which the course is offered. Laboratory, continuing education, and activity courses may not be audited. Students 60 years or older may audit on a space-available basis.

Final Examinations

A final examination period during which no regular courses meet is scheduled at the end of the fall and spring semesters. Final examinations are given during this period. There is no specially scheduled period for final examinations in the summer semester.

Except for honors, problems, seminars, and language and fine arts performance courses, the last examination (last unit test or comprehensive test) in a course must be given during the examination period specified by the University Committee on Academic Procedures and is published in the *Course Schedule*. Courses may have take-home examinations, projects, papers (excluding term papers), or other media, in lieu of written final examinations as the last evaluation instrument in the course. In such instances, a deadline for submittal of the medium may not be earlier than the time of the end of the course's scheduled examination period as published in the *Course Schedule*.

Tuition and Fees for Graduate Students

Keith L. Ratzloff, Controller

Tuition and fees are established annually by the Kansas Board of Regents. Tuition is assessed at a rate per credit hour, where the rate depends on residency (resident or nonresident) and level of credit (graduate or undergraduate.)

Fall 1999/Spring 2000/ Summer 2000 Semesters

Graduate credit (per credit hour)

Resident	$101.00
Non-Resident	$329.75

Undergraduate credit (per credit hour)

Resident	$ 68.05
Non-Resident	$283.00

Students are additionally assessed a campus privilege fee, based on credit hours taken. The fee for fall and spring semesters is $64 for the first hour and $17 for each additional hour to a maximum fee of $251. The rate is adjusted downward during the summer term.

The Graduate School has an application fee of $25 for all international students.

Students enrolled in engineering curricula are assessed an engineering equipment fee of $85 (full-time student) or $42.50 (part-time student) per fall and spring semester; $42.50 for four or more hours and $21.25 for less than four hours during the summer semester. See the College of Engineering

Fees subject to change

The following schedule of fees was in effect when this catalog was prepared. However, there is no guarantee this schedule will not be changed without notice before the beginning of any semester or summer term.

Students will be assessed for all hours in which they are enrolled, including those for which the grade of W is recorded. Students withdrawing from courses are eligible for refunds in accordance with the refund policy.

Students receiving scholarships or grants not processed through the K-State Office of Student Financial Assistance before registration will be required to pay the full amount of their tuition and fees from personal resources.

Payment of tuition and fees

Statements will be mailed to all students who enroll during the early enrollment period. With the exceptions noted below, enrollments will be canceled if not paid by mail or in person by the deadline noted in the payment instructions enclosed with the statement. If a student is awarded financial aid and that financial aid is sufficient to pay all outstanding charges on the student's account as shown on the statement, the student must still affirm that he/she will be attending classes or classes will be dropped. Students who enroll after the early enrollment period but before the deadline for canceling classes will also be informed of the payment deadline. Students who enroll after the deadline for canceling classes but before the first day of classes, must pay by the first day of classes or be subject to a $50 special handling fee. Any student who enrolls on or after the first day of classes will be assessed a $50 special handling fee. Students may call 785-532-FEES (3337) at any time to obtain balance due and/or pay by credit card (VISA, MasterCard, or Discover). A fee is charged for credit card payments.

Exceptions: If the student's eligibility to receive financial aid is verifiable prior to the student's fee payment due date, the director of Student Financial Assistance may authorize the deferment of payment of tuition and fees in accordance with the Board of Regents policy and procedures manual (Chapter 2, Section E). The student's obligation to pay regularly assessed tuition and fees is not reduced by an approval to defer payment. Listed below are the deferment categories that can be authorized:

Category 1000 (no special handling fee assessed): financial aid deferment
Will be authorized for those students who have fulfilled the application requirements and whose awards have been made by the June packaging date, but whose aid has not been disbursed. Deferments will be granted only to the approved level of financial aid eligibility. The amount of tuition and fees over and above the anticipated financial aid award must be paid by the student at the time of fee payment.

Category 2000 (special handling fee assessed): application delayed/financial aid
Will be authorized to those students who have applied for financial aid, but have not met the scheduled application deadlines. Deferments will be limited only to the amount of anticipated aid eligibility. A payment of one-third down or an amount equal to the aid that has been received, whichever is greater, will be required.

Category 3100 (special handling fee assessed): graduate teaching sssistants
Full tuition deferment only. Will be required to pay campus privilege fees. Deferment due in full by December 1 for the fall semester and April 1 for the spring semester.

Category 3200: veterans
Full tuition deferment only. Will be required to pay campus privilege fee. Deferment due in full by December 1 for the fall semester and April 1 for the spring semester.

Category 3300 (special handling fee assessed): international students
Full tuition deferment only. Will be required to pay campus privilege fees. Deferment due in full by December 1 for the fall semester and April 1 for the spring semester.

In addition, a student may choose to sign up for a monthly payment plan offered by Academic Management Services in association with K-State. There will be a fee to sign up for this payment plan. For more information on the payment plan call AMS at 1-800-635-0120.

Returned checks

Checks that are returned uncollectible by financial institutions will be subject to a $30 charge, in addition to all other fees.

Withholding student records

The university withholds students' academic records for nonpayment of fees, loans, and other appropriate charges and for nonreturn of university property.

Tuition

This is the student's contribution toward the costs of instruction and covers approximately 20 to 25 percent of the instructional costs.

Campus Privilege Fees

Educational Opportunity Fund
This fee aids the academic achievement and progress of underrepresented K-State students.

Student services support
This fee finances adaption and equipping of Holton Hall for improved delivery of student services programs.

Student health
For a description of the services provided by this fee, see the section on Lafene Health Center in this catalog.

K-State Student Union repair and replacement
This fee is used for repairs and replacements at the K-State Student Union.

Rec Complex debt retirement
In 1991 a student referendum was passed allowing bonds to be issued to support the expansion of the Peters Recreation Complex.

Rec Complex operations
Part of the 1991 student referendum in which a portion of the support fee for the Peters Recreation Complex will fund daily operations of the expanded facility.

Rec Complex repair and replacement reserve
Part of the 1991 student referendum in which a portion of the support fee for the Peters Recreation Complex will provide a reserve for repairs to the facility and replacement of equipment.

Activity
This fee is used for a range of student interests and activities. Students enrolling in 6 or fewer credit hours do not pay a full activities fee and are not entitled to student ticket rates for certain activities.

K-State Student Union
This fee is used for the administration, support, and operation of the student K-State Student Union.

Student publications
This fee supports the *Collegian* and *Royal Purple*.

Recreational Services
This fee supports the Chester E. Peters Recreation Complex (equipment, interior upkeep, supplies, etc.)

KSDB-FM
This fee supports the student radio station (equipment, means of service to operate the station, recent upgrade of power wattage, etc.).

Athletics
This fee supports intercollegiate athletics.

Fine arts
This fee supports fine arts programming (theater, dance, music, art, etc.).

Student publications equipment
This is a temporary fee to provide new equipment for student publications (*Collegian* and *Royal Purple*).

Bramlage Coliseum repair and replacement
1992 student legislation provided for the continuation of a portion of the debt retirement fee previously assessed for the Bramlage Coliseum bonds following their retirement in May of 1993.

Library expansion
In 1991 a student referendum was passed providing for a $5 million commitment by students to partially fund the expansion of the library.

K-State Student Union enhancement
1994 student legislation provided this fee to be used for K-State Student Union infrastructure upgrade, facilities refurbished, and expansion of the facility.

K-State Student Union special program
1994 student legislation provided this fee to be used for campus activities programming.

Office of Student Activities and Services
This fee was implemented to separate the administrative operating budget of the Student Governing Association and its entities from the Student Activity Fee; thus removing it from competition with general student groups within the same funding pool.

Schedule of Fees

The following schedule of fees was in effect when this catalog was prepared.

Contracts and compensatory charge

This schedule does not limit the charges that may be collected under arrangements with other governmental or private agencies, except that such arrangements may not provide for lesser charges. Compensatory or other charges to more nearly cover the actual cost of instruction are specifically authorized.

Fall/spring semester

	Resident	Non-resident
Tuition (Based on course level)		
Undergraduate (per credit hour)	$ 68.05c	$ 283.00
Graduate (per credit hour)	$ 101.00c	$ 329.75
Veterinary medicine (enrolled in 7 or more credit hours)	$2,399.00	$8,400.00
Campus privilege fee rates a,b		
1st hour	$ 64.00	$ 64.00
2nd through 12th hour	$ 17.00	$ 17.00
Maximum fee for 12 hours or more	$251.00	$251.00

Summer term

	Resident	Non-resident
Tuition (Based on course level)		
Undergraduate (per credit hour)	$ 68.50c	$ 283.00
Graduate (per credit hour)	$101.00c	$ 329.75
Veterinary medicine (per credit hour)	$160.00d	$560.00d
Campus privilege fee rates		
1st hour	$ 30.00	$ 30.00
2nd through 5th hour	$ 13.50	$ 13.50
Maximum fee for 6 hours or more	$ 97.50	$ 97.50

Special fees (based on student classisfication)

Undergraduate and graduate students enrolled in engineering curricula will be assessed an engineering fee as follows:

Fall and spring semesters	
Full-time	$85.00
Part-time	42.50
Summer term	
Four or more hours	42.50
Less than four hours	21.25
January intersession	21.25

[a]Students enrolled in a spring semester, but not attending summer term may access Lafene Health Center services during the summer by paying a $35 fee, due prior to receiving services. A student who has paid his/her health fee may elect to provide his/her non-student spouse with health services eligibility by paying a fee of $85 per fall/spring semester or $35 for a summer term, due prior to receiving services. These fees remain constant regardless of point of time in the semester or term they are paid. Full-time employees of Kansas State University enrolled in classes are not assessed a student health fee, but may elect to pay the fee, based upon enrolled credit hours, and therefore be eligible for Lafene Health Center services.

[b]Students who will be at off-campus locations during an entire semester and will reside outside of a 30-mile radius of the Manhattan campus during the semester are exempt from all campus privilege fees.

[c]Employees (as defined in eligibility for resident fees) are assessed resident tuition.

[d]Students in the veterinary medicine senior class are assessed three equal tuition payments based on 5 credit hours for the summer term and full tuition for the following fall and spring semesters. The tuition assessments will be equal, but the campus privilege fees assessments will be based on the applicable amounts for each enrollment period.

Auditing

Auditing is permitted on a space available basis which allows course attendance without participation or credit upon approval of the instructor. This privilege is not applicable to laboratory and continuing education courses. Any resident of Kansas 60 years of age or older may audit courses at no cost, but still must obtain approval of instructor and the dean.

Application for admission processing fees (not subject to refund)

For post-baccalaureate programs in the Departments of Architecture, and Landscape Architecture/Regional and Community Planning (not applicable to other fees)	$30.00
For post-baccalaureate programs in College of Business Administration	$45.00
For international students to post-baccalaureate programs except Business Administration	$25.00

Off-campus courses (based on course level)

Undergraduate	$90.00 per credit hour
Graduate credit	$132.00 per credit hour
No credit	Lowest advertised tuition rate per hour
Non-credit courses	Vary to correspond with total direct costs

Regents center construction fee
Students enrolled in K-State courses offered in the KU Regents Center in Kansas City will be assessed a $10-per-credit-hour charge to defray costs of construction of this new facility.

Course charge
An additional charge may be made to correspond with the actual costs of providing goods and services which are an integral part of presenting a course bearing academic credit, such as equipment and laboratory fees, media fees, testing fees, equipment rental, video/audio tapes, supplies and directly related items.

TELENET media fee
(For courses delivered via Kansas Regents Network)

1-credit-hour course	$25.00
2-credit-hour course	$30.00
3-credit-hour course	$35.00
Library Service Fee	$ 6.00

On-campus courses administered through the Division of Continuing Education

Credit level	Resident	Non-resident
Undergraduate per credit hour	$ 80.00	$295.00
Graduate per credit hour	$113.00	$341.75
Veterinary medicine per credit hour	$172.00	$572.00

No credit/audit	Lowest advertised resident/non-resident tuition rate from above.
Non-credit courses	Vary to correspond with total direct costs.

Music instruction—total fee

Group guitar/piano per semester	$ 88.00
Private lessons per semester	$152.00

Course charge
An additional charge may be made to correspond with the actual costs of providing goods and services that are an integral part of presenting a course bearing academic credit, such as equipment and laboratory fees, media fees, testing fees, equipment rental, video/audio tapes, supplies and directly related items.

Student fees (both credit and applicable non-credit courses)
Campus privilege fees per day $1*
*Not to exceed the maximum privilege fee assessed per semester

Conferences, institutes, and seminars

Non-credit	Vary to correspond with total direct costs

Eligibility for Resident Tuition

A. Residents

Persons enrolling in the university who, if adults, have not been, or if minors, whose parents have not been residents of the state of Kansas for 12 months prior to first-time enrollment for any semester or term in the university are nonresidents for fee purposes. An application for resident classification for fee purposes is available in the Graduate School and must be completed to be considered for resident classification.

B. Employees

1. Employees of universities under the Kansas Board of Regents, other than hourly student employees, working .40 FTE time or more as follows:

a. For fall semesters: Employed September 1 through November 17.

b. For spring semesters: Employed February 1 through April 17.

c. For summer terms: Employed the duration or employed from February 1 through April 17.

d. For the term in which a graduate degree is awarded.

2. Employees of the federal government given adjunct appointments at Kansas State University or assigned to one of the ROTC units at Kansas State University.

C. Military

1. Military personnel stationed and living in Kansas except military personnel assigned to K-State as full-time students.

2. People who are domiciliary residents of the state, who were in active military service prior to becoming domiciliary residents of the state, who were present in the state for a period of not less than two years during their tenure in active military service, whose domiciliary residence was established in the state within 30 days of discharge or retirement from active military service under honorable conditions, but whose domiciliary residence was not established in time to meet the residence duration requirement.

D. Exchange students from Missouri

Students eligible to pay resident fees at the University of Missouri who are enrolled in the following programs at Kansas State University: bachelor of architecture; B.S. in architectural engineering; B.S. in bakery science and management; B.S. in construction science (not available for new and readmitted students); B.S. in feed science and management; B.S. in milling science and management; B.S. in horticultural therapy; and bachelor of interior architecture; bachelor of landscape architecture; MS and Ph.D. in grain science and industry. This privilege is granted in exchange for resident tuition for Kansas students who enroll in certain programs in Missouri (subject to limitation arbitrated by Kansas Board of Regents and Missouri Board of Education).

E. Kansas high school graduates

Persons who are not domiciliary residents of the state, who have graduated from a high school accredited by the state Board of Education within six months of enrollment, who were domiciliary residents of the state at the time of graduation from high school or within 12 months prior to graduation from high school, and who are entitled to admission at a state educational institution pursuant to K.S.A. 72-116, and amendments thereto.

F. Recruited/transferred employee

Persons who have been recruited to Kansas for full-timed employment or transferred to a Kansas location within the last 12 months and their dependents. Self-employed persons are not eligible for this resident tuition status.

Refund Policy

A. On-campus

The following table applies to students who completely withdraw from a semester, summer term, field geology or private music lessons and to the reduction in tuition and fees for students who reduce their enrollment. Refund percentages will not apply if enrollment is reduced then later increased to the same number of credit hours and level of courses (grad and undergrad) during the same refund percentage period. Refunds will not be made until sufficient time has lapsed to ensure that fee payment checks have been honored by the bank—usually 15 days after student pays.

Regular semesters

Time of withdrawal	*Refund*
Through 1st full calendar week	100%
Through 2nd full calendar week	90%
Through 3rd and 4th calendar weeks	50%
After 4th calendar week	No Refund

Summer term

Time of withdrawal	*Refund*
Through 1st Friday of classes	100%
Through 2nd Friday of classes	50%
After 2nd Friday of classes	No Refund

Fall and spring

For courses less than 4 weeks, 100% refund will be given through the day after the course begins. No refund will be given after that time.

Academic action taken after the last day of the semester or summer term will not result in a refund.

The summer term refund periods above refer to both 8 week and 6 week classes. For classes less than 6 weeks, 100% refund will be given through the day after the course begins. No refund will be given after that time.

Federal regulations may require students attending the university for the first time, who receive federal financial aid (grants, loans or work study) under Title IV or whose parent receives a loan under Title IV on behalf of the student who fully withdraws from the university, to be subject to a different refund policy. Contact the Office of Student Financial Assistance for details.

B. Military

Students serving in the National Guard or Reserves who are called to active duty during an academic term are entitled to receive a full refund of tuition and fees. Students who are drafted and must report for active duty during an academic term are entitled to receive a full refund of tuition and fees. All refunds are subject to presentation of official military documentation. Students who volunteer for military service will be subject to the university's non-military refund policy. Room and board charges will be prorated to the extent that services have been provided.

C. Continuing education refunds

1. Extension courses
   a. Credit courses
      i. 100% refund if requested prior to second course meeting or if the course is canceled.
      ii. 50% refund if requested after the second course meeting.
      iii. No refund if requested after one-third of the scheduled class meetings.
      iv. Extension course fees are not transferable.
   b. Non-credit courses Fees are non-refundable unless, subsequent to acceptance of the fees, the service, at the option of the university, is not provided.
   c. Federal regulations may require students attending the university for the first time, who receive student financial aid (grants, loans or work assistance) under Title IV or whose parent receives a loan under title IV on behalf of the student, who fully withdraw from the university, to be subject to a different refund policy. Contact the Office of Student Financial Assistance for details.

2. Conferences, institutes, and seminars
Refund policies will be published in the registration brochure, and refunds for cancellation of registration will be determined in relation to the actual share of the participant cost in effect at the time of the cancellation request.

For more information
E-mail: cashiers@ksu.edu
785-532-6317

Degree Requirements

Master's Degrees

Subject to the approval of the graduate program, the candidate may choose one of the following program options: (1) a minimum of 30 semester hours of graduate credit including a master's thesis of 6 to 8 semester hours; (2) a minimum of 30 semester hours of graduate credit including a written report of 2 semester hours either of research or of problem work on a topic in the major field; or (3) a minimum of 30 semester hours of graduate credit in course work only, but including evidence of scholarly effort such as term papers or production of creative work, as determined by the student's supervisory committee. Some programs may require more than 30 credits. For example, candidates for the master of public administration must complete at least 42 hours, the master of regional and community planning degree a minimum of 48 hours, the master of business administration 33 hours, and the master of fine arts 60 hours. Successful completion of a final oral examination or comprehensive written examination or both shall be required of all master's degree candidates, the specific form being determined by individual programs. The final examination is administered by the supervisory committee and may include a defense of the thesis or report, an interpretation of other scholarly products, or a testing of the student's understanding of the field(s) of study.

Before the end of the second semester of graduate study, the student must file with the Graduate School a "program of study" that serves as a planning document. The student's program of study is prepared with the assistance of a supervisory committee consisting of the major advisor and two other graduate faculty members. The program is subject to the approval of the dean of the Graduate School upon recommendation of the supervisory committee and the appropriate department head or program chair. The program may be modified on further recommendation of the supervisory committee and the approval of the graduate dean. If a student's program of study includes any course credits more than six years old at the time the student is about to complete all degree requirements, the final master's examination will normally include an examination over the body of course work listed on the program of study. The form and content of this competency examination is determined by each master's program, which may impose additional requirements for revalidating the student's competency in the supporting course work. In a master's program for which such a revalidation examination may be inappropriate, an exception to this policy may be sought from the dean of the Graduate School.

Three copies of theses and reports are required for submission to the Graduate School. All such reports and theses will be sent by the Graduate School to the Kansas State University Libraries and bound in cloth in accordance with specifications for Class A binding of the Library Binding Institute. A charge to cover the cost of binding will be posted to a student's University account after the Graduate School receives the notice from a student of intention to graduate. If students desire to publish all or part of their theses before the degree is conferred, major professors should notify the Graduate School in advance by letter. If approved by the major professor, master's theses may be placed on file with University Microfilms, which will also publish an abstract in *Master's Abstracts*. Since master's theses and reports are submitted as part of degree requirements, the university retains the right to publish any portion as a contribution to knowledge. Patentable items created under university auspices are subject to the Regents patent policy.

Doctoral Degrees

Normally, students admitted to doctoral study hold the master's degree, but some programs allow highly qualified students to proceed directly from the bachelor's degree to the doctorate. Completing a master's degree at Kansas State University does not automatically lead to admission to doctoral study, and a separate application must be made to the program and approved by the graduate dean for those intending to continue to the doctoral degree.

Award of a doctorate normally requires the successful completion of the equivalent of at least three years of full-time study beyond the baccalaureate, as well as the completion of a major research study reported in a doctoral dissertation. Completion of the program involves more than the accumulation of credit and its duration is variable, because the time required to finish the research study cannot be anticipated with certainty. However, guidelines for the times by which the preliminary and final examinations are to be passed mean that in most cases the program should take no longer than eight years. In completing research and the resulting dissertation, students must adhere to the enrollment requirements described in a later section on registration and enrollment.

During the first year of study, a supervisory committee is formed for each student. The committee consists of at least four members of the graduate faculty, one of whom is the professor (advisor). One member of the supervisory committee must be a graduate faculty member from outside the major professor's department. In consultation with the major professor, a student selects committee members, subject to the approval of the department head/chair. The committee aids the student in the preparation of the program of study. The supervisory committee and the program of study must be approved by the dean of the Graduate School and should be on file in the Graduate School at least one month before the preliminary examination is taken.

Normally, the student will have met the preliminary examination requirement at the close of the second year of doctoral study and should in all cases have met it within three years of entry into the doctoral program. Successful completion of this requirement is a necessary condition for admission to doctoral candidacy and must be accomplished at least seven months before the doctoral final examination. The supervisory committee is responsible for recommending candidacy to the Graduate School. At this time the graduate dean appoints an outside chairperson. The supervisory committee plus the outside chairperson form the examining committee for the final examination.

Early in the doctoral work a dissertation subject is chosen in the major field and approved by the supervisory committee. The dissertation must represent original investigation that contributes new knowledge or understanding to the candidate's field. On completion of at least three years of graduate study as prescribed by the supervisory committee and on completion of a dissertation, the candidate must pass a final examination.

The period of candidacy may last up to five years from the end of the semester in which the preliminary examination was passed. If a student fails to complete both the dissertation and final oral examination within this period, the student may be dropped from candidacy. A student whose candidacy has thus lapsed may regain the status of a doctoral candidate by successfully retaking the preliminary exam. Failure to maintain continuous enrollment for the fall and spring semesters, from the completion of the preliminary examination until the dissertation is accepted by the Graduate School, also will result in loss of candidacy.

Three final copies of the dissertation with abstracts must be submitted to the dean of the Graduate School as a last requirement to be met for award of the degree. Inasmuch as the dissertation is submitted to the university in satisfaction of degree requirements, the university retains the right to use or publish any portion thereof as a contribution to knowledge. Moreover, patentable items created under university auspices are subject to the Regents' patent policy.

If consistent with departmental policy and Graduate School guidelines, the format of theses and dissertations may be in a style suitable for submission to a professional journal. In such cases, additional introductory material, bibliographies, and other supplementary information not to be submitted with the journal manuscript should be included as appendices.

The three copies of the dissertation will be bound in cloth in accordance with specifications for Class A binding of the Library Binding Institute. A charge to cover the cost of binding will be posted to a student's university account after the Graduate School receives the notice from a student of intention to graduate. Each dissertation is microfilmed and an abstract is published in *Dissertation Abstracts*.

If publication of the dissertation, in whole or in part, is to be made before the degree is conferred, the major professor should notify the dean of the Graduate School by letter in advance of such publication. Publication of any part of a dissertation should show, through footnote or otherwise, that the material is from a dissertation presented in partial fulfillment of the requirements for a doctoral degree in the subject department at Kansas State University.

Doctor of philosophy

Students admitted to Ph.D. programs must complete a year of full-time study in residence at Kansas State University during which they must complete at least 24 hours of regular degree credit requirements. This "residency" requirement is unique to the doctoral degree and is intended to immerse the student in scholarly activities of the campus learning community. Graduate research assistants and teaching assistants may satisfy the equivalent of 6 residence credit hours for each semester in which they hold appointments for at least 0.4 time. With approval of the dean of the Graduate School, unclassified staff and classified employees whose positions give them direct involvement in their disciplines comparable to that required of teaching and research assistants may satisfy the equivalent of 6 resident course work credit hours for each semester in which they hold appointments for at least 0.4 time.

For the Ph.D. a minimum of 30 hours in research is required, not including work done toward a master's degree. Programs of study must include at least 90 hours.

The foreign language requirement for the Ph.D. is determined as a matter of policy by the graduate faculty in each department. Where a language is required, it is understood that "foreign language" refers to languages other than English and that the language(s) required would have a significant body of literature relevant to the field. Required foreign language examinations are administered by the Department of Modern Languages. The language requirement must be satisfied before the student is admitted to candidacy.

Doctor of education

The Ed.D. is offered through the College of Education. While many of the requirements are the same as those for the Ph.D. and are noted in another section of this catalog, the Ed.D. has some that are unique. Residence for the Ed.D. may be accomplished by one of the following patterns: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of 6 additional hours of course work completed in one intervening semester; 24 hours of course work within 12 calendar months.

A total of 94 semester hours must be completed. Up to 30 hours for a master's degree and at least 16 hours of dissertation research may be included as part of the total. See the College of Education section of this catalog for additional requirements for the Ed.D.

Student Responsibility

Graduate students are held responsible for knowing all published academic policies and degree requirements and so should familiarize themselves with information in this catalog and the *Graduate Handbook*. They are likewise held responsible for knowing the regulations concerning the degree they plan to take and any special requirements within the program or academic unit. In addition, it is the student's responsibility to be informed of the university's policies regarding the standard of work required for continued enrollment in the Graduate School. The Graduate School should be consulted if additional information is needed.

Although it is customary for many graduate students to work continuously throughout the year, especially on thesis and dissertation research, the major professor or certain supervisory committee members may not be available during the summer months. This is especially the case for faculty members on nine-month appointments who may be pursuing other activities off campus during that time. Students should take such possibilities into account in scheduling various examinations and thesis or dissertation reviews.

Graduate Credit and Grades

The course and research requirements for graduate degrees are expressed in terms of graduate credit. Graduate credit may not be earned by examination or by correspondence.

Grades

The following grades are used in the Graduate School: A, B, C, D, F, Credit, No Credit, Incomplete, and Withdrawn. A candidate for an advanced degree must have a 3.0 cumulative grade point average and a 3.0 on course work on the program of study. To count for graduate credit the grade in a course must be C or better and no course may be counted more than once in a program. Retaken courses remain on the transcript and are considered as part of the record. A graduate student's record will be reviewed after the completion of each session.

The grade of Incomplete normally is given in regular courses (other than independent studies, research, and problems) only for verifiable personal emergencies. The faculty member has the responsibility to provide written notification to the student of the incomplete work. The student has the responsibility to take the initiative in completing the work and is expected to make up the incomplete during the first semester in residence at the university after receiving the grade of I. If the student does not make up the incomplete during the first semester in residence at the university after receiving it, a grade may be given by the faculty member without further consultation with the student.

If, after the end of the first semester, the I remains on the record it will be designated as F for record-keeping purposes and will be computed in the student's GPA, weighted at 0 points per credit. The designation of NR (no grade reported) will be treated the same way.

Nongraded work

At the discretion of the graduate faculty of the department concerned, seminars or colloquia, in which letter grading conflicts with the objectives intended, may be offered on a Credit/No Credit or Pass/Fail basis rather than for a letter grade. The seminars and colloquia which are to be offered for Credit/No Credit or Pass/Fail shall be listed with the dean of the Graduate School. All courses on the program of study except research (report, thesis, or dissertation) and seminars or colloquia which have been approved for Credit/No Credit or Pass/Fail must be taken for letter grades. All research credit hours must be graded as Credit/No Credit. Independently of the program of study, additional courses may be taken on a Credit/No Credit or Pass/Fail basis with the approval of the major professor and the professor offering the course. These courses may not be applied toward a degree. No more than 3 hours of Credit/No Credit or Pass/Fail courses may appear on the program of study for the master's degree, nor more than 6 for a doctoral degree.

Academic Probation and Dismissal

Admission to and continuation in the Graduate School depends upon a high level of achievement. Students may be placed on probation as a condition of their admission to graduate programs, if warranted by their prior academic record. In addition, students who fail to make satisfactory progress in their graduate programs will be placed on probation. Either of the following conditions will warrant probation: (a) a grade point average lower than 3.0; (b) the recommendation of the major professor or student's committee that the student's progress is unsatisfactory.

Students on probation as a condition of admission will acquire good standing if they achieve a cumulative GPA of at least 3.0 in the first 9 credit hours of graduate course work. Students placed on probation for deficient grades will be restored to good standing if they achieve a cumulative GPA of 3.0. Normally, this must be done within two semesters for full-time students and within 12 credit hours for part-time students.

A graduate student will be denied continued enrollment in the university for any of the following reasons:

a. Failure of a student on probation as a condition of admission to achieve a minimum cumulative GPA of 3.0 in the first 9 hours of graduate level course work;

b. Failure of a student placed on probation for deficient grades to achieve a cumulative GPA of at least 3.0 within two semesters for full-time students and within 12 credit hours for part-time students;

c. Failure to meet published departmental or university requirements;

d. Failure to maintain satisfactory progress toward a graduate degree;

e. Failure in the preliminary examination (doctoral students only) or the final examination;

f. Failure to acquire mastery of the methodology and content in a field sufficient to complete a successful thesis or dissertation;

g. Qualifying for placement on probation a second time, except when the first period of probation is a condition of admission or when the second period is a condition of reinstatement.

A student denied the privilege of continued enrollment may petition the graduate dean for reinstatement to the same curriculum or for admission to a different curriculum.

Providing False Information

An individual who withholds information or provides false information on graduate admission applications or to any university official, faculty/staff member, or office may have his/her application denied or may be dismissed from the university. The decision for dismissal will be made by the dean of the Graduate School. This decision will be made after a complete and thorough review of the situation and an individual conference with the student involved. The individual dismissed has the right to appeal the decision. Contact the Graduate School for information on appeal procedures.

Auxiliary Services and Facilities

Affirmative Action Office

Clyde Howard, Director
Affirmative Action Office
214 Anderson Hall
785-532-6220
Fax: 785-532-4374
E-mail: affact@ksu.edu
Home page: http://www.ksu.edu/affact

The Affirmative Action Office is available to students on matters of equal opportunity in admissions, access to programs and activities, and employment. The university is committed to equal educational opportunity regardless of race, sex, national origin, handicap, religion, age, or sexual orientation. Any barriers that students encounter for these reasons should be discussed with this office.

Alumni Association

Amy Button Renz, President
KSU Alumni Association
2323 Anderson, Suite 400
Phone: 785-532-6260 or
1-800-600-ALUM (2586)
Fax: 785-532-5068
E-mail: alumni@k-state.com
Home page: http://www.k-state.com/

The Kansas State University Alumni Association is a 35,000-member organization. It is an independent group of alumni and friends devoted to the university.

The nonprofit organization supports K-State through student recruitment programs, scholarships, publication of the *K-Stater*, sponsorship of reunions and local alumni gatherings, and maintenance of records on more than 166,000 alumni and friends.

Child Care

KSU Child Development Center

Angela Allison, Director
1948 Jardine Dr., L-9
785-539-1806

The KSU Child Development Center is a nonprofit corporation serving the child care needs of K-State students, faculty, and staff. It is fully licensed by Kansas and is professionally staffed. Its facilities are in building L of Jardine Terrace. The environment is designed to foster children's social, emotional, cognitive, language, and physical development.

The center offers full-day programs for toddlers (ages 12 months and walking through 2½), preschoolers (ages 2½ through 5), and school-age children (ages 5–12). Limited part-time program spaces are offered to families of toddler and preschool children who need regular flexible care. Transportation provided to/from Manhattan public elementary schools.

Early Childhood Laboratory and Hoeflin Stone House Child Care Center

Mary DeLuccie, Director
Justin Hall
785-532-1475

The Early Childhood Laboratory hosts an interagency program with USD 383. The facility integrates children who have disabilities or developmental delays with children who are developing typically. The program accommodates 44 children with an age range from 3 to 5 years in a part-day program, with both morning and afternoon sessions. Both facilities are licensed by the Kansas State Department of Health and Environment and accredited by the National Academy of Early Childhood Programs.

The Hoeflin Stone House Child Care Center is on the northeast edge of campus. The center provides full day care for 30 children ranging in age from 18 months to 5 years. Priority is given to children of working parents. The program focuses on the children's developmental needs and interests.

The activities and environment at both facilities are designed to foster children's cognitive, language, social, emotional, and physical growth and development.

Family Center

Stephan R. Bollman, Director
Nancy T. O'Conner, Clinical Director
Campus Creek Road
785-532-6984

The Family Center provides applied educational experiences to students while offering family-related educational outreach, counseling, and consultation services to the Manhattan community and the state. The Family Center provides an interdisciplinary focus with faculty participation from departments within the college.

Students, under faculty supervision, offer services involving marriage and family therapy and family life education. Special workshops address particular family topics, including solo parenting, parent education, premarital groups, and family life. The annual National Rural Families Conference features the Ruth Hoeflin Forum on Family Issues.

Services are available to students and the general public. A fee is assessed based on a sliding scale.

Foundation

Gary A. Hellebust, President/CEO
KSU Foundation Center
2323 Anderson, Suite 500
785-532-6266, 532-7505
E-mail: KSUFDN@found.ksu.edu
Home page: http://www.found.ksu.edu/

The Kansas State University Foundation, the official fund-raising arm of the university, is a nonprofit organization certified under Section 501 (C) (3) of the IRS Code of 1954. The foundation acts as the custodian for gifts to the university and is encouraged to receive and hold in trust any real and personal property given for the use of Kansas State University, and to administer and control all the gifts to provide services that are not or cannot be provided through appropriated funds.

Although the foundation is not a bank it offers many of the same services and is responsible for the administration of more than 2,000 scholarships and the processing of 65,000 gifts annually, while administering total assets of $220 million. Policy is formulated by a 175-member board of trustees and an executive committee of 15 members to which the staff, directed by the president/CEO, is responsible.

Information Systems

John W. Streeter, Director
Information Systems
2323 Anderson Avenue, Suite 215
Manhattan, KS 66502–2912
Office: 785-532-6281
Fax: 785-532-6284
E-mail: ISO@ksu.edu
Help desk: 785-532-6282
Help desk e-mail: HELPDESK@ksu.edu
Home page: http://www2.iso.ksu.edu/

Centrally operated computing application and data base servers supporting the teaching, research, and public service missions of the university are administered by the Office of Information Systems. Services consist of data management, database administration, applications software development and implementation, systems project management, systems analysis, applications programming, opera-

tional support, and a user help desk hotline service. Major applications systems include admissions, financial assistance, registration and fees, billing and receivables, student records, human resources, budgeting, financial accounting, fixed asset inventory, and facilities management.

The Office of Information Systems deploys and supports a variety of modern hardware, systems, database and applications software in a networked computing environment. It employs approximately 50 technical staff, including 10–15 undergraduate and graduate students, in technically challenging part-time positions.

Institutional Advancement

Robert S. Krause, Vice President
122 Anderson Hall
785-532-5942

The vice president for institutional advancement is responsible for the external relations of the university and is the chief student affairs officer. Additionally, the vice president coordinates ongoing activities with the KSU Foundation, KSU Alumni Association, and Department of Intercollegiate Athletics, and external relations with governmental agencies, the Board of Regents, and other university constituents. The vice president for institutional advancement reports directly to the president and serves as chief spokesperson for the university.

Police Department

108 Edwards Hall
West side
785-532-6412 business
911 emergency
E-mail: police@ksu.edu
Home page: http://www.ksu.edu/police

The University Police Department is responsible for the protection of all properties owned and operated by the state educational institution or its affiliates. This authority is granted under state law. While service to the K-State community is of great concern to the department, the prevention of crime and investigation of all reported crimes is also of prime importance.

The department assists with parking control and regulates traffic control. Traffic and parking regulations are established by a student/faculty/staff Traffic and Parking Council, by authority of K.S.A.-74:3211. The department is responsible for providing physical security on campus property. This includes opening and closing buildings, monitoring security cameras, and maintaining 23 emergency telephones strategically located throughout the university.

The University Police Department is open 24 hours a day. It provides a contact for emergency repairs and acts as the university operator outside normal business hours. The department has sworn police officers on duty 24 hours a day.

Postal Service

113 Dykstra Hall
785-532-7751
E-mail: centralmailservices@ksu.edu
Home page: http://www.ksu.edu/facilities/admin/mailop.htm

All mail for students must be addressed to their Manhattan residences, not the university. Manhattan Post Office personnel deliver U.S. mail directly to university buildings and residence halls and picks up outgoing U.S. mail from various locations on the campus. The proper address format is as follows:

Attn line or name
Kansas State University
Room # and building name or name of residence hall
Manhattan, Kansas 66506 and the proper + four code

Contract post office

785-532-7751

The contract post office sells stamps, money orders, and other postal supplies; weighs, insures, and registers mail; and receives outgoing U.S. mail. A self-service postal unit is in the K-State Student Union. The hours of the contract post office are 9 a.m.–11:30 a.m. and 12:30 p.m.–3:30 p.m., Monday through Friday. It is located at the west end of Dykstra Hall. Come to this office for any personal shipping by the United States Postal Service.

Call the above number for information on the contract post office.The clerk provides fast up-to-date postal services for the campus community as a whole; this entails a great deal of walk-in business each day. Central Mail Services provides the support for the contract post office and can provide you with the same up-to-date answers to your postal questions quickly.

Central Mail Services

Central Mail Services is located north of Dykstra Hall in the dry storage building. Hours of operation are 8 a.m.–noon and 1–5 p.m., Monday through Friday. Central Mail Services provides a variety of services which are charged back to the department by means of a meter account number. Carriers include: United States Postal Service, United Parcel Service, and Federal Express. Come to this office for charging postage on mail or packages back to a campus department.

Speech and Hearing Center

107 Leasure Hall
785-532-6879, 532-6873

The Speech and Hearing Center provides evaluation, management, and consultation services to university students with articulation, fluency, voice, language, or hearing impairments. These clinical services are also available to children and adults from the surrounding communities. The center provides educational and clinical experiences for students preparing for careers in speech-language pathology and audiology.

Student Publications

Ron Johnson, Director
103 Kedzie Hall
785-532-6555

Student Publications Inc. is a nonprofit student publishing corporation that publishes the daily student newspaper, the *Kansas State Collegian*; the student yearbook, the *Royal Purple*; and *Campus Connections*, the campus phone book. Student Publications is governed by the Board of Student Publications, composed of eight students elected by the student body annually; three students appointed by the news staff, ad staff, and *Royal Purple* staff; and three faculty members appointed by the university president.

The Board of Student Publications names an editor in chief and advertising manager of the *Collegian* three times each year. The *Royal Purple* editor is chosen in the spring for the following year. The editors and advertising managers hire students for staff positions.

The *Collegian* and *Royal Purple* each have faculty advisors, but their content is determined and controlled solely by the editors and student staffs.

Telecommunications Services

Fred Damkroger, Director
109 East Stadium
785-532-7001

Telecommunications provides the voice, data and video transmission capabilities for the university. Copper and fiber optic cable connect all buildings on the main campus and on the Salina campus. Buried fiber cable con-

nects the KSU Foundation Center and other units off the main campus. Direct lines provide data and voice communication between the main campus and the Salina campus.

The department currently maintains four Lucent Technologies Definity PBX switches. These are on the main campus, the KSU Football Complex, the Manhattan Learning Center, and on the Salina campus. The voice network is constantly being upgraded to provide the best service possible. Voice mail along with other advanced features is available to all location on the network.

Dial in modem access to the campus network systems is also available throught the Telecommunications Department. Several plans are available including an 800-number into the modem pool. Telecommunications is a registered internet service provider with the KCC.

Telecommunicatons routes service for administrative departments over the state's KANS-A-N network. We provide service for personal use, it is not allowed on the KANS-A-N network, via the department's Conversant interactive voice response system. Calls may be routed over other facilities provided by a variety of vendors, including Southwestern Bell, AT&T, and Qwest.

The department also provides service for the residence halls. Each student has an opportunity to obtain an authorization code for long distance access.

University Relations

John Fairman, Assistant Vice President for University Relations
122 Anderson Hall
785-532-6269

University Relations is responsible for licensing activities related to the institution's name and logos and coordinates public information for K-State activities and events through University Relations and its four units: News Services, Photographic Services, Printing Services, and University Publications. News Services is the official outlet for print and broadcast news materials relating to K-State policies and administration. News Services also publishes *In-View*, the official faculty-staff newsletter.

Photographic Services offers photoprocessing, location and studio photography, and slide reproduction.

Printing Services prints books, brochures, business cards, envelopes, letterheads, posters, and other printed matter. Second- and third-class mailing services are available to all departments and affiliated organizations.

University Publications provides editing, design, and production coordination of enrollment management, recruitment, and informational publications.

Financial Assistance

In order to support research, scholarship, and the acquisition of advanced degrees, the university offers several kinds of financial aid for graduate students. These include fellowships, traineeships, teaching assistantships, and research assistantships. In addition, a variety of loan programs are available to graduate students.

Teaching and Research Assistantships

Individual departments and graduate programs administer graduate student financial assistance primarily in the form of teaching and research assistantships. Award of assistantships is based on the student's ability and promise and is usually made for either nine or twelve months. The maximum appointment is for half time, but appointments for lesser fractions also may be made. Continuation of appointments is subject to availability of funds and academic performance in "good standing" in the Graduate School (GPA 3.0 or greater). Information on applying for graduate assistantships may be obtained from the head of the department concerned.

Students are eligible for tuition benefits for each term in which they hold an appointment of at least 0.4 time. Graduate research assistants pay tuition at the staff rate; in addition, those who have been on appointments for at least 0.4 time during the spring term are eligible for staff fees during the following summer term, even though they may not hold assistantships. Graduate teaching assistants receive a full tuition waiver for spring and fall semesters in which they hold at least a 0.4 appointment. These waivers are not available in the summer, but, like research assistants, teaching assistants pay staff fees for the term if they have held at least a 0.4 appointment in the previous spring. Funds are provided for tuition benefits only; students will be responsible for campus privilege fees (student health, activity fees, etc.).

To be eligible for tuition benefits, students must be enrolled for a minimum of 6 graduate credit hours in a fall and spring semester. Individual departments may also require minimum enrollment in the summer of 3 graduate credit hours. The maximum enrollment for graduate assistants is 10 hours for 0.5 and 12 hours for 0.4 appointments. The corresponding maximums for a summer term are 5 and 6 hours respectively.

Graduate teaching assistants must be on appointment from September 1 through November 17 for the fall semester and February 1 through April 17 for the spring semester. (Dates are subject to change.) If a graduate appointment does not begin by these dates or terminates before these ending dates, all tuition benefits will be lost. The student then is responsible for the total tuition payment.

All prospective graduate teaching assistants who are non-native speakers of English shall be required to achieve a minimum score of 50 on the TSE (Test of Spoken English).

Traineeships

The university has a number of traineeships available. Several departments also have federally supported traineeships available under the programs of the National Institutes of Health and other agencies. Contact individual departments for information.

Loans

Kansas State University offers four differing loan programs to its graduate student population: the Federal Stafford Loan/Federal Direct Loan, the Federal Perkins Loan, the Health Professions Student Loan (HPSL), and Alumni/Foundation Loans. Before a graduate student may be considered for one or more of the above listed loan programs, he/she must have successfully applied for financial assistance utilizing the Free Application for Federal Student Aid (FAFSA). The FAFSA is academic year specific, and should, therefore, be completed well in advance of each academic year for which a student is seeking financial assistance.

Eligible graduate students may be offered either a Federal Stafford Loan or a Federal Direct Loan by Kansas State University. Under the Federal Stafford Loan Program, a student must locate a private lender, such as a bank or credit union, from whom to borrow the loan funds. Under the Federal Direct Loan Program, a student borrows funds directly from the federal government through Kansas State University. Currently, the interest rate for either loan type is capped at 8.25% and is set anew each July 1st. In addition, qualifying graduate students may also be eligible to borrow under the Federal Perkins Loan Program (5% interest), the Health Profession Student Loan Program (5% interest), and/or the Alumni/Foundation Loan Program (6% interest). Finally, graduate stu-

dents may also borrow, on a case-by-case basis, from emergency, alumni, and endowment funds.

Students interested in any of the above listed loan programs are encouraged to contact the Office of Student Financial Assistance for more detailed information or contact them on-line through their homepage at *http://www.ksu.edu/sfa*.

Satisfactory Academic Progress

Federal regulations require that financial aid recipients make satisfactory academic progress in order to remain eligible for federal financial assistance. Satisfactory academic progress regulations apply to such forms of assistance as: the Federal Stafford Loan Program, the Federal Direct Loan Program, the Federal Perkins Loan Program, the Health Professions Student Loan Program, and the Federal College Work Study Program. The only programs which are exempt are athletic grants-in-aid and other, non-federally funded forms of assistance.

Kansas State University has established standards of satisfactory academic progress for the purpose of evaluating a student's efforts to earn a degree within a specified time frame. The evaluative standards are comprised of qualitative as well as quantitative components. One of the quantitative aspects prescribes a ratio of credit hours attempted to credit hours successfully completed which a student must meet in order to remain eligible for federal financial assistance. The other quantitative measure sets a limit upon the total number of attempted credit hours for which a student may receive federal financial assistance during his/her program of study. The qualitative component of the satisfactory academic progress standards addresses the minimum allowable grade point average which a student must achieve in credit hours completed in order to remain eligible for federal student financial assistance. Note: All recipients of federal financial assistance are required to meet the standards of satisfactory academic progress. The monitoring of satisfactory academic progress begins with the first term in which a student is the recipient of any form of federal financial assistance. For more detailed information on the topic of satisfactory academic progress, contact the Office of Student Financial Assistance, 104 Fairchild Hall, 785-532-6420.

Quantitative satisfactory academic progress standards

Graduate students	Hours attempted per semester	Minimum hours to complete per semester*
Full time	9 and above	7
Half time	5–8.5	4

*Hours completed in excess of the required minimum standard will carry over as "credits" into subsequent semesters. Hours completed which fall short of the minimum standard are also carried forward into subsequent semesters, and are referred to as "deficiencies."

The maximum number of attempted hours for which a graduate student may receive federal student financial assistance is 60 (master's degree program) and/or 120 (doctoral degree programs). Any graduate student who exceeds these maximum hours will not be eligible for further federal financial assistance, without going through the established appeals process.

Qualitative satisfactory academic progress standards

In order to remain eligible for federal financial assistance students must meet the qualitative standards as set out in the Academic Probation and Dismissal section of this catalog.

Further considerations

A course cannot be counted twice for financial assistance purposes. Example: A student has received a D in a 3-credit-hour course and takes that course again in order to earn a higher grade. The credit hours have already been counted as financial assistance hours and cannot be counted again, even though the student's g.p.a. may be improved.

Courses in which a grade of F or incomplete (I), (IX), withdrawn (WD), no grade reported (NR), or no credit reported (NC) are not counted in the qualitative portion of the satisfactory academic progress standards. Graduate students receive credit for incompletes in research that follows the published degree requirements as elective or required courses, or courses taken as a part of developmental studies.

Financial assistance warning

Students who fail to meet K-State's satisfactory academic progress standards at the end of the spring semester will be placed on financial assistance "warning" for the following semester. At the conclusion of the following academic year, the student's academic progress will, once again, be measured. The student will be reinstated into the "satisfactory" academic progress status if he or she has met K-State's standards. However, a student will be placed on financial assistance "exclusion" status if he or she has failed to meet K-State's academic progress standards.

Financial assistance exclusion

Students with a financial assistance "exclusion" status are denied any federal form of student financial assistance until they have met K-State's satisfactory academic progress standards. Students are permitted to appeal their "exclusion" status with the Office of Student Financial Assistance. If an appeal is approved, federal financial assistance, if available, may be reinstated for the semester in question.

Financial Assistance Exclusion Appeal Process

Appeal forms for satisfactory academic progress are available at the Office of Student Financial Assistance. Appeal are made in writing to the satisfactory academic progress administrative officer. Students filing an appeal are encouraged to outline a specific strategy for academic recovery as well as to provide a written statement of support from their academic advisor. Premised upon professional judgment, the completed appeal may be either approved or denied by the Office of Student Financial Assistance. The student may be required to participate in special activities to improve his/her academic progress. Decisions regarding appeals are final and, consequently, not subject to further review.

Services for Students

Adult Student Services

Nancy Bolsen, Director
101 Holton Hall
785-532-6434
E-mail: old@ksu.edu
Home page: http://www.ksu.edu/adult

Adult Student Services assists undergraduate and graduate students who are married, have children, are re-entering the educational system after several years, or are 25 years of age or older. Staff members assist students with admission and enrollment and provide information or referrals for housing, child care, refresher and study skills courses, tutoring, financial aid, insurance, public school enrollment, community family programs, emergency locator, and commuter information. Staff members work with university and student groups to make their experiences as adult students at K-State successful ones. Staff also help students with their everyday challenges and special concerns before, during, and after their admission to K-State.

Alcohol and Other Drug Education Service

Bill Arck, Director
214 Lafene Health Center
785-532-6927
Home page: http://www.ksu.edu/ucs/aodes.html

The Alcohol and Other Drug Education Service offers information about physical effects and social issues related to alcohol and other drug use or abuse. Campus services provided include media activities such as newspaper ads, posters, brochures, and radio public service announcements; coordination of and participation in awareness events, such as National Collegiate Alcohol Awareness Week; and presentations providing information on alcohol and drug-related topics.

This office can also make referrals to various resources for those with concerns about their own or another's possible alcohol and/or drug use or abuse.

Career and Employment Services

Tracey L. Fraser, Director
Holtz Hall
785-532-6506
Home page: www.ksu.edu/ces

Career and Employment Services (CES) assists Kansas State University students and alumni with activities related to finding employment. Whether seeking part-time employment while attending classes, a summer job, a curriculum-related internship/co-op experience, or a full-time career position, CES can provide assistance. Strong academic programs, capable students, and a campus work ethic combine to give K-State students a distinct advantage over those from many institutions in planning and achieving vocational/professional and graduate study goals.

Career and Employment Services is a centralized service and resource center, containing an extensive, up-to-date job search library, a staff dedicated to assisting you in your job search, and contacts with thousands of employers throughout the country. The office brings together students, faculty members, and employer representatives seeking college educated personnel. We sincerely believe students utilizing our office will develop a thorough understanding of themselves and the opportunities available upon graduation from Kansas State University. Resources and services available include: job vacancy announcements; job search training materials covering topics such as resume preparation, interviewing techniques, and job market trends; employer directories; company profiles; salary information; prospective employer lists; individual advising; SEARCH (a candidate referral service); on-campus interviews; and career fairs.

Disabled Student Services

Gretchen Holden, Director
202 Holton Hall
785-532-6441
E-mail: dss@ksu.edu
Home page: http://www.ksu.edu/dss

Disabled Student Services (DSS) works to meet the needs of students with physical disabilities, documented learning disabilities and Attention Deficit Disorder by providing supportive services and academic accommodations. Academic accommodations include readers, note takers, and assistance obtaining taped texts. Test taking accommodations, including tests administered with extended time, scribes, orally and in quiet environments, can be arranged through the DSS office. Sign language interpreters are available with sufficient notice. Classes scheduled in inaccessible locations will be relocated for students with mobility impairments upon request. Individualized help with enrollment is available. Staff will work as a liaison with students' instructors.

Special equipment for use by students is located in Hale Library, (microforms and periodicals) and includes a Closed Caption or CCTV, Arkenstone Reading Machine, talking calculator, variable-speed tape recorders, and voice recognition software. FM listening systems are available for use during public events at McCain Auditorium, the K-State Student Union, and Bramlage Coliseum. FM listening systems may be borrowed from DSS for use in classes. Text Telephones (TTY) are available in the Office of Admissions, University Police and the DSS office. A shuttle van, equipped with hydraulic lift, operates on campus between all buildings and is available to students with temporary or permanent physical limitations. Accessible housing is available.

Division of Continuing Education

Elizabeth A. Unger, Vice Provost and Dean of Continuing Education
College Court Building
785-532-5566
Home page: http://www.dce.ksu.edu

The Division of Continuing Education brings together K-State's intellectual resources with learners throughout Kansas. Classes and programs are provided in many communities by face-to-face instruction through the use of technology. The university makes use of the Regents Network (TELENET 2) a video-conferencing system, the Regents Educational Communications Center, a video production facility and multi-media instruction using computer networks. Credit and non-credit programs are offered for those seeking degrees, professional updates, or personal enrichment. For detailed information on offerings call 785-532-5566 or 1-800-432-8222, info@dce.ksu.edu or visit the World Wide Web site at http://www.dce.ksu.edu.

Distance learning

The Division of Continuing Education offers many courses and degree programs through distance education, using a variety of delivery methods including the World Wide Web, videotapes, audiotapes, TELENET 2, and other technologies. A current listing of distance learning courses can be found on the web at http://www.dce.ksu.edu/dce/distance/

K-State offers the following graduate degree programs through the Division of Continuing Education:

Distance learning master's degree programs
Master's in agribusiness
http://www.dce.ksu.edu/course_marketing/agecon/

Engineering degree programs
Electrical engineering, civil engineering, software engineering, chemical engineering and engineering management)
http://www.dce.ksu.edu/dce/engg/

Master's degree programs in Salina
Educational administration and leadership
http://www.dce.ksu.edu/dce/as/edadminleader/

Master's degree programs in the Kansas City area, Wichita, and Salina
Adult and continuing education
http://www.dce.ksu.edu/dce/as/adulteduc/index.html

Graduate-level course work leading to a specialty in elementary/secondary education
English as a Second Language Speciality
http://www.dce.ksu.edu/dce/as/esl/

Classroom technology specialty
http://www.dce.ksu.edu/dce/as/shrtech/

K-State Online

K-State Online is a system for K-State faculty and students to utilize for courses on the World Wide Web. K-State Online offers class presentation, messaging, and real-time discussion components. Many K-State Online courses use slide shows and audio clips to enhance the online learning experience. In addition, many courses feature interactive discussion sessions that allow students to listen to lectures and respond to their professor with questions and comments in real-time.

Any student may create an account on K-State Online by going to the following URL and clicking the "create an account" button: *http://online.ksu.edu.*

K-State Online is one technology tool that has been created as a support tool for mediated instruction at K-State. Other support services for teaching, learning and the use of technology are available for K-State faculty and students through the Information Technology Assistance Center (ITAC), *http://www.ksu.edu/itac/*

Special summer programs and activities

Summer Adventure
Summer Adventure is a special on-campus summer program for children, grades kindergarten through six, which incorporates educational and physical activities along with enrichment programs. Full-day and half-day sessions are available. Activities include swimming, gymnastics, dance, mathematics, music, drama, science and language arts. Field trips and films are some of the tools used in the enrichment program. For more information contact Conferences and Non-Credit Programs, Kansas State University, College Court Building, Manhattan, Kansas 66506–6006, 785-532-5575, or visit the World Wide Web site at *www.dce.ksu.edu/dce/summer/*

High school programs
Each summer K-State offers a number of special programs and courses for high school students on the Manhattan campus. Some of the subject areas offered include business, architecture, debate, music, band, sports, cheerleading, journalism and others. For a complete listing of these programs contact the Division of Continuing Education, 131 College Court Building, Manhattan; *info@dce.ksu.edu*; or visit the World Wide Web site at *dce.ksu.edu/dce/summer/*

Summer courses for K–12 teachers and administrators
A special brochure provides a comprehensive listing of all on-campus and Division of Continuing Education courses for teachers that are offered June through August. Courses are held on the Manhattan campus, at various locations throughout the state, through distance learning, and through travel-study trips.

Teachers who wish to take course work at a distance have many choices. Courses are offered via: desktop video network, TELENET 2; videotape; audiotape; World Wide Web; guided study; and on-site throughout the state, including Kansas City, Salina, Topeka, and Wichita.

For a brochure contact the Division of Continuing Education, 131 College Court Building, Manhattan, KS 66506, 785-532-5566, 1-800-432-8222, e-mail info@dce.ksu.edu, or visit the World Wide Web site at *dce.ksu.edu/dce/summer/*

Intersession

K-State conducts its Intersession program during major breaks in the standard academic calendar. There are three intersessions each year; one in January, one in late May, early June and one in August. During intersession, more than 50 courses are offered including both regular and new or experimental courses. Intersession courses are considered part of the regular K-State course offerings and can fulfill degree requirements. Students are encouraged to consult with their advisors to determine if a particular intersession course will meet requirements.

Conferences and non-credit programs

Conferences and Non-Credit Programs makes university facilities and resources available to individuals and organizations through the design and management of conferences, short courses, workshops, and special interest programs. Non-credit or professional education is provided to the legal, accounting, veterinary medical, and educational communities on a regular basis. Professional education is an expanding science. For further information, contact Conferences and Non-Credit Programs at 785/532-5575. Look for a current conference and non-credit program listing on the web at *http://www.dce.ksu.edu/dce/non-credit.html.*

Regents Network (TELENET 2)

Many courses and educational programs offered on the K-State campus are available to the people of Kansas by means of the Regents Network (TELENET 2, a desktop video-conferencing network of educational centers located throughout Kansas linked together via ISDN telephone lines. There are TELENET 2 classrooms in Arkansas City, Belleville, Chanute, Colby, Concordia, Dodge City, El Dorado, Emporia, Garden City, Great Bend, Hays, Hutchinson, Independence, Lawrence, Leavenworth, Liberal, Manhattan, Marysville, Norton, Overland Park, Pittsburg, Pratt, Sabetha, Salina, Stockton, Sublette, Topeka, and Wichita.

Fort Riley courses

K-State works in cooperation with the Army Education Center to provide the Fort Riley community the opportunity to take university courses. Courses are scheduled at convenient times to assist military personnel and their dependents.

The courses are taught by regular K-State faculty members and allow the pursuit of associate, bachelor's and master's degrees in several academic disciplines. K-State courses offered at Fort Riley are open to all area residents, although military personnel have priority.

K-State maintains an office at Fort Riley staffed by K-State personnel familiar with degree requirements and procedures on acceptance of transfer work. Students are encouraged to meet with these advisors to pursue their academic goals. For additional information contact the K-State coordinator at Fort Riley, 785-784-5930.

IDEA Center

The IDEA (Individual Development and Educational Assessment) Center provides products and services to assist in assessing and improving teaching and learning at the post-secondary level. The center serves any post-secondary organization or constituency engaged in the teaching-learning enterprise. In its service to external constituencies, the center's central focus is on providing high quality services and products that support the evaluation and development of programs and professional personnel. Its purpose is to contribute to the improvement of teaching-learning processes and their outcomes. It is responsible for coordinating the periodic assessment of major on- and off-campus educational programs of K-State, including programs focused on basic skills, the major field, general education, and distance learning.

Graduate Student Council

Home page: http://www.ksu.edu/grad/gsc

This body of elected representatives is composed of graduate students from each of the academic departments. Under the leadership of its elected president, the council works with the graduate dean in advancing matters that have campuswide impact on graduate students.

Housing and Dining Services

Charles Werring, Director
Housing and Dining Services
104 Pittman Building
785-532-6453
888-568-5027 (toll free)
Fax: 785-532-6855
E-mail: housing@ksu.edu
Home page: http://www.ksu.edu/housing

K-State's Department of Housing and Dining Services provides residence hall living for approximately 3,800 students, a leadership/scholarship house for women and 528 apartments for students and their families.

Residence halls

The residence halls provide many lifestyle options for students. Both single gender and coeducational halls are available. In addition, specialty options such as the RESPECT program, intensive study, academic cluster, and nonsmoking floors provide living styles most often requested by students today. Each hall has a different character and varies in size and structure. Most rooms are double occupancy, although some large triples and suites are available. Most halls are accessible to physically disabled students.

To start the reservation process, return the housing application card with a nonrefundable $25 application fee ($12.50 for those entering in the spring). Upon receipt, Housing and Dining Services will send a residence hall contract, which when returned with the appropriate payment, will reserve a space in the residence halls. Students pay for their room and board by semester, either by full payment or an installment plan. Assignment is made on a first come, first serve basis, so early application and submission of contract is encouraged. The cost of room and board is set on an annual basis, and is one of the lowest rates in the Big 12.

Jardine Apartment Complex

Student families and married couples may apply for one and two bedroom apartments, furnished or unfurnished, at the Jardine Apartment Complex. Early application is recommended since assignment is made on a first come, first serve basis. Single graduate and nontraditional students are welcome to apply and will be assigned after families and married couples have received their assignments.

These affordable apartments are close to the campus. Rent includes gas, water, and trash. A deposit is required. Coin operated laundry facilities are available. The community center is available for rent by tenants. Those residing in the Jardine Apartment Complex use the residents' council to govern community life.

Apartments are partially accessible for people with physical limitations. The department is pleased to work with students and family members to accommodate special needs.

International Student Center

Donna Davis, Director
785-532-6448
E-mail: intlstucenter@ksu.edu
Home page: http://www.ksu.edu/intlstucenter

The International Student Center provides a comfortable, relaxed atmosphere where people wanting to increase their international perspective can always find new friends. The three-building complex has been completely funded by private gifts to the university. The main building opened in 1978 and includes a multipurpose meeting room, dining room, kitchen, and reading lounge. In November 1998 construction was completed on a new Taiwan Wing for international student services. The Taiwan Wing provides space for the Foreign Student Office staff, who have the primary responsibility of assisting all K-State nonimmigrants with their immigration paperwork and related matters. They also provide leadership and support for a variety of programs that promote global awareness and understanding.

In addition to the Taiwan Wing, also completed in November 1998 was renovation of previous office space into what is now called the Korean Room. The Korean Room is a small media center that has computers, a television viewing area, general meeting space, and a small office for the students' International Coordinating Council.

People interested in getting involved with the programs of the International Student Center are invited to call the Foreign Student Office at for more information.

K-State Student Union

Bernard Pitts, Executive Director
785-532-6591
Home page: http://www.union.ksu.edu/

The K-State Student Union is the campus center for social, recreational, educational, and cultural activities. This 260,000 square foot multipurpose facility opened in March 1956 and is supported only by generated revenue and student fees. The student union embarked on a $11.5 million renovation in May 1998 that is slated for completion in July 2000.

The K-State Student Union was built entirely by student fees. It features a full-service bookstore; a food service operation that includes Bluemont Buffet, Manchu Wok, Sbarro, Burger King, Taco Bell, bakery, salad bar, ice cream counter, and deli area; catering; and satellite food carts that include the Bookplate Cafe, the Arch Cafe, and The Treehouse.

The Union also has a recreation area complete with bowling, billiards, video games, proshop, and engraving and metal photo services; a Subway sandwich shop; an art gallery; information counter; full-service campus Commerce Bank; copy center; campus ID card center; postal center; ATM machines; two auditoriums; campus vending services; and reservation and conference services.

Union Program Council is the student volunteer arm of the K-State Student Union. UPC provides more than 350 programs each year for the social, cultural, educational and personal growth of students. The Office of Student Activities and Services is located on the ground floor.

The Union Governing Board is the body that establishes policy under which the K-State Student Union director and staff operate.

Lafene Health Center

Lannie W. Zweimiller, Director
785-532-6544
Home page: http://www.ksu.edu/lafene/

The Lafene Health Center is a modern ambulatory healthcare facility designed to provide for most student outpatient health needs. The health center is fully accredited by the Joint Commission on Accreditation of Healthcare Organizations. Students who have paid the health fee as a part of their tuition are eligible for care. Non-student spouses, university conference participants, and other campus visitors may receive care upon payment of a special fee.

Lafene Health Center provides, through a full complement of medical and other professional personnel, a range of services that include special clinics for sports-related injuries, women, and allergies and immunizations, as well as a clinic for general care. Also included are services in health education, nutrition, and physical therapy. The services of a pharmacy, laboratory, and x-ray are available at reduced rates. The center is staffed by full-time physicians with medical support personnel. When necessary, the student is referred to specialists for treatment at the student's expense.

After regular clinic hours, a student who is ill or injured may receive medical care at a local hospital, at the student's expense. Home visits are not made. The local ambulance service is available, when needed, to transport patients to the appropriate health care facility.

Insurance

It is strongly recommended that all students at K-State carry medical insurance. A university-sponsored student health insurance plan is available at special rates. This plan covers most services provided at Lafene Health Center and allowed claims for medical expenses if the student requires care away from the campus.

Medical history

K-State requires a complete medical history, including a current immunization record, on all new students or transfer students. This history must be completed on the Kansas State University medical history form and is required prior to provision of non-emergency treatment at the health center. A physical examination is not required, but encouraged, and a copy of this examination assists the staff in evaluating illnesses. If a student has a continuing medical problem, a summary from the attending physician is helpful should treatment at the center be needed. Students receiving allergy injections must furnish instructions from their allergist before injections can be administered at the health center.

Multicultural Student Organizations

Dawnielle Robinson, Coordinator
224 Anderson Hall
785-532-6436

Emphasis is placed on building strong cultural groups that help foster the development of leadership skills and roles for multicultural students on campus; supporting multicultural student organizations, including Asian–American Students for Intercultural Awareness (ASIA), Black Student Union (BSU), the Hispanic American Leadership Organization (HALO), Native American Student Body (NASB), and other special interest organizations; assisting student organizations in sponsoring programs and activities that bring multicultural leaders and role models to K-State; and heightening multicultural awareness within the community.

Office of Student Life

Pat J. Bosco, Associate Vice President for Institutional Advancement
and Dean of Student Life
122 Anderson Hall
785-532-6237

Carla Jones, Associate Dean
102 Holton Hall
785-532-6432
Home page: http://www.ksu.edu/studentlife/

Student life services, including Admissions, Financial Assistance, Greek Affairs, Housing, K-State Student Union, New Student Services, Recreational Services, Registrar, and the associate and assistant deans of the Office of Student Life, are coordinated and directed by the associate vice president and dean. These units meet the needs of prospective and enrolled students.

The Office of Student Life is responsible for the Student Governing Association, student activities, the administration of the judicial program for nonacademic misconduct, and student crises. Student activities, Adult Student Services, Religious Affairs, and the International Student Center are supervised and supported by this office. Staff members coordinate assistance to students and families in times of personal crisis and are available to students for general advice, counsel, and assistance with personal problems.

Recreational Services

Raydon H. Robel, Director
101 Chester E. Peters Recreation Complex
Phone: 785-532-6980
E-mail: recservices@ksu.edu
Home page: http://www.recservices.ksu.edu/

Recreational Services provides intramural activities, recreational sports, and fitness programs for the campus. Recognized as one of the best collegiate fitness and recreation facilities in the nation, the Chester E. Peters Recreation Complex houses 14 handball/racquetball courts, two squash courts, three gyms containing 10 basketball courts (convertible to volleyball, badminton, and tennis), a large weight and fitness room equipped with a variety of cardiovascular fitness machines and free weight equipment, aerobic/multipurpose room, two walking/running tracks, combative room, table tennis room, locker rooms, saunas, lounges, and administrative offices.

Outdoor facilities include lighted tennis and handball/racquetball courts, lighted multipurpose playfields, lighted sand volleyball courts, horseshoe pits, and a fitness cluster with running trail. Outdoor recreational equipment and camping equipment is available on a rental basis at the Outdoor Rental Center. The natatorium at the Ahearn Sports Complex has two 25-yard swimming pools, one diving pool with two 1-meter and two 3-meter boards, and a sun deck.

Intramural sports are the scheduled competitive activities of the recreation program. Teams are organized by fraternities, sororities, residence hall floors, and off-campus, co-rec, and faculty/staff groups. More than 40 different intramural activities are offered for competition.

Recreational Services provides student employment for lifeguards, building supervisors, exercise leaders, sports officials, office assistants, and rental/grounds managers.

Religious Affairs

Don Fallon, Coordinator
102 Holton Hall
785-532-6432

The coordinator of religious activities in Holton Hall provides information regarding religious activities and organizations on campus and in the community. Pastoral care and counseling are available through this office and by referral. Students may seek counseling regarding relationships, sexuality, death and loss, or other personal and spiritual concerns. Two memorial chapels on campus, Danforth and All Faiths, are available for student worship, weddings, and private meditation.

Student Activities and Services

Gayle Spencer, Coordinator
K-State Student Union
785-532-6541

The coordinator of Student Activities is housed in the Office of Student Activities and Services. The OSAS staff assists students in identifying co-curricular activities and avenues of campus involvement designed to complement their formal education.

The coordinator also advises the Student Governing Association and student judicial system, administers the student activity fee, and assists individuals and groups who wish to organize and register their activities on the K-State campus. Leadership workshops are organized annually, and consultation is available for leadership development to interested campus leaders and organizations.

Student Government

Gayle Spencer, Coordinator
K-State Student Union
785-532-6541

The purpose of the Student Governing Association is to help students voice any concerns, suggestions, or grievances they may have. Every student is automatically a member of the Student Governing Association and is represented by a college council (elected by the students in each respective college), by one student senator for each 300 students enrolled in the colleges, and by the student body president. The student senators and the student body president are elected by the K-State student body each March.

SGA is divided into three branches: legislative, judicial, and executive. The legislative branch consists of student senate and is composed of seven standing committees: academic affairs and university relations, communications, privilege fee, allocations, senate operations, student affairs and social services, and governmental relations. A major function of student senate is the allocation of the student activity fee and the Educational Opportunity Fund, which are collected as part of the tuition payment. These funds are used to assist student and university organizations in providing programming and services for the K-State community.

The judicial branch is overseen by the attorney general and is composed of judicial council, student review board, tribunal, parking citation appeals board, and living group judicial boards.

The student body president, vice president and cabinet make up the executive branch. The president has the responsibility to promote the general welfare of the students and acts as the official voice of the student body to the faculty, administration, and public.

The University Activities Board, an arm of SGA, oversees the more than 325 organizations that are available to students, faculty, staff, and community members. UAB provides services for organizations such as workshops, informational materials, assistance with fund raising, and a student handbook. Any organization desiring to become a registered organization must adhere to University Activities Board guidelines. Registered groups may schedule rooms and tables on campus, and post notices on campus bulletin boards.

Graduate student council

This body of elected representatives is composed of graduate students from each of the academic colleges. Under the leadership of its elected president, the council works with the graduate dean in advancing matters of campuswide impact on graduate students.

University Counseling Services

Fred Newton, Ph.D., Director
232 Lafene Health Center
785-532-6927
E-mail: ucs@ksu.edu
Home page: http://www.ksu.edu/ucs

University Counseling Services is open 8 a.m. to 5 p.m. Monday through Friday. Tuesday evening appointments are offered from 5 to 7 p.m. during the academic year. Professional counselors and psychologists assist K-State students with academic, career, and personal concerns. Psychiatric consultation is available through referral from UCS counselors.

The mission of University Counseling Services is to provide short-term assistance in areas of decision-making, crisis intervention, problem solution, adjustment, or matters of personal concern that could interfere with academic success. Treatment options include individual, couple, and/or group counseling. Psychological testing may be used as an adjunct to career or personal counseling. In addition, programs using a workshop or seminar format are offered to enhance personal growth and skill development; these may include stress management, biofeedback, or relationship enhancement, among others. When such time-limited service is not sufficient to meet your needs, the staff will help identify referral alternatives within the community.

Consultation by center staff members is offered to individual students, staff, or faculty members concerning their work and living environments. Additionally, the staff is available for class or group presentations and workshops upon request.

Women's Center

Susan L. Allen, Ph.D., Director
206 Holton Hall
785-532-6444
E-mail: womenscenter@ksu.edu
Home page: http://www.ksu.edu/womenscenter/

The Women's Center works with individual students and the campus community to promote the well-being of K-State students through advocacy, programming, training, information, and referral services. The center works closely with offices and agencies to help women who are in crisis for reasons of violence and abuse. We provide free self-defense classes for women students. Our staff facilitates presentations on topics relevant to women and we are building a video library that we share with groups. We support students who are undertaking justice- and gender-related research projects and programs. We provide a safe environment for students who want to discuss issues related to sexuality. Our goals are to raise the level of awareness and understanding of issues relevant to women; to motivate both women and men toward improvement of circumstances that adversely affect women; and to help women find and explore options in their lives. We edit an interactive newsletter, *Women's Circle Online,* on our home page as a means of informing and building a sense of community among the 2,400-plus K-State women faculty and staff on campus and around the state.

Support Services

Early Childhood Laboratory

The Early Childhood Laboratory, located on Campus Creek Road, houses two preschool classrooms and is sponsored by the School of Family Studies and Human Services and the local public school system, U.S.D. 383. The Early Childhood Laboratory is licensed by the state and is accredited by the National Academy of Early Childhood Programs. The children enrolled at the center range in age from three to five years. Children who are eligible by age to enter kindergarten are not eligible for enrollment at the center. The group is balanced by age and sex of the children. Within these guidelines, children are accepted by date of application. The program integrates children with developmental delays with typically developing children. The children with special needs are identified by U.S.D. 383. The total group size is 44 children. About one-third of the children have handicapping conditions. The two standard half-day preschool sessions are operated Monday through Thursday, 8:30–11:30 a.m., 12:30–3:30 p.m. The two extended sessions are opperated Monday through Friday 7:45 a.m.–12:15 p.m. and 12:30–5 p.m.

Family Center

The Family Center provides applied educational training to students while offering counseling, family-related educational programs, and consultation services to Manhattan and the state. On-site services include individual, couple, family, and group therapy, parent education, and family life education sessions. Outreach services include the state training office for child care providers and other training programs for children and families. These services are supported by outside funding that has averaged over a quarter of a million dollars for the past several years.

Galichia Institute

The Galichia Institute for Gerontology and Family Studies is designed to provide: increased understanding and response by students to the needs of seniors; greater awareness by society of the needs of an ever-expanding elderly population; better -prepared students to serve society, with understanding of programs for children and the elderly; support for families raising children and coping with elderly relatives; continued growth of research and information concerning aging issues; national attention for professional activities; improved care for rural and urban elderly; expanded understanding of intergenerational relations; and educational programs to families that will enrich the lives of aging family members. Recent programs include the Personal Actions to Health (PATH), a demonstration program on senior health issues, funded by the Kansas Health Foundation.

Hoeflin Stone House Child Care Center

Stone House is located on the north side of campus on North Manhattan Avenue. The two-story house and architect-designed playground provide space for two groups of children: toddlers, ranging in age from 18 months to 3 years, and preschoolers, aged 3 to 5 years. Children who are eligible by age to enter kindergarten are not eligible for the program. The toddler group accommodates 12 children, and 18 children are enrolled in the preschool group. The groups are balanced by sex and age of the children.

Priority is given to children whose parents work full time. Within these guidelines, children are accepted by date of application. The center is available only for full-day enrollments, five days a week. The hours are 7:30 a.m. to 5:30 p.m., and the center is open for most of the year, with the exception of university holidays, three weeks in August, and two weeks at the end of December. The Hoeflin Stone House Child Care Center is licensed by the state and is accredited by the National Academy of Early Childhood Programs.

Other Research Facilities and Equipment

A variety of specialized facilities is maintained to support research and scholarly work in the humanities, natural sciences, applied sciences, social sciences, and professional areas. Although an exhaustive listing is prohibitive, the following list represents a selection of supporting resources:

Aquatic and terrestrial research laboratories
Arp electronic music synthesizer
Audiovisual materials center
Center for Excellence in Computer-Controlled Automation
Center for Extended Services and Studies Computer-Aided Design Laboratories (human ecology)
Consortium for Political Research data banks
Controlled environment test facility
Editorial offices of major journals
Experimental animal facilities
Fourier transform spectroscopic laboratory
Glassblowing and instrument shops
Greenhouses
Heliodon and wind tunnel
Herbarium and monographic library
Insect reference collection
Interior architectural shops
Marriage and Family Therapy Clinic
Near infrared protein laboratory
Nuclear magnetic resonance spectrometers
Physiology of exercise laboratory
Plant disease diagnostic laboratory
Population and demographic laboratory
Recording Raman spectrometer
Scanning electron microscope
Soil testing laboratory
Speech and Hearing Center
Statistical laboratory
Textile chemistry laboratory
Textile conservation laboratory
Transmission electron microscope
Veterinary diagnostic laboratory
Weather data laboratory
Wind and soil erosion laboratory
X-ray diffractometers

Scholarly and Professional Publications

Center for Basic Cancer Research
Accepting a Challenge, Kansas State cancer research and education.

College of Architecture and Design
Newsletter of the Rural/Small Town Planning Division, American Planning Association-information, articles, and essays on the nature of rural/small town planning.

Oz, modern architectural trends.

Environmental and Architectural Phenomenology Newsletter, information and features on environmental design as place making.

College of Education
Educational Considerations, timely papers on educational issues at all levels.

Media Adult Learning, research, reviews, papers.

College of Engineering
Kansas State Engineer, technical and non-technical articles on engineering developments.

Research Activities, biennial report on research in the College of Engineering.

College of Veterinary Medicine
Veterinary and Human Toxicology, toxicology, research, reviews, and field observation.

Continuing Education
National Issues in Higher Education, proceedings of annual meetings on educational issues.

IDEA Papers, series on college teaching, from the Center for Faculty Evaluation and Development.

Cooperative Agricultural Extension
Numerous publications about research, in varied formats for various audiences.

Department of English
Literary Magazine Review, reviews of literary magazines and commentary on the international noncommercial literary magazine scene.

Touchstone, student literary magazine.

The Spenser Newsletter, the official publication of the Spenser Society.

Department of History
Journal of the West, history and culture of the U.S. West.

Department of Modern Languages
Studies in Twentieth Century Literature, literary theory and practical criticism of 20th-century literature in French, German, Russian, and Spanish (with University of Nebraska, Lincoln).

Libraries
Bibliography Series, each bibliography on a different topic.

University Press of Kansas

Fred M. Woodward, Director
2501 West 15th Street
Lawrence, Kansas 66049–3905
785-864-4154

Kansas State University, in association with the other five Regents universities, operates and supports the University Press of Kansas for the purpose of publishing scholarly and regional books on a nonprofit basis.

K-State joined the consortium in 1967 when the press was officially reorganized by the Kansas Board of Regents. Until mid-1982, the operation was known as the Regents Press of Kansas.

The University Press of Kansas is the first American university press to operate as a statewide consortium under the specific sponsorship of all the state's universities. A member of the Association of American University Presses since its founding in 1946, the press has published over 800 titles, with more than 500 currently in print. Its ongoing American Presidency Series, with 30 titles issued to date, has been praised as one of the most interesting and rewarding historical series in this country.

The press is governed by a board of trustees, who are the chief academic officers of the sponsoring institutions and who appoint two members and two alternates from each faculty to serve on the advisory editorial committee.

Research Facilities and Centers

Special Research Guidelines

Home page: http://www.ksu.edu/research/index.html
E-mail: comply@research.ksu.edu

Special research guidelines are in place for scholarly activities that fall into a variety of categories. These include work involving human subjects, which must be reviewed by a human safety oversight committee, and research involving animals, which must be reviewed by the institutional animal care and use committee. Research that is focused on infectious diseases and hazardous chemicals, or which uses recombinant DNA technology, must be reviewed by a biosafety oversight committee. Research involving artifacts that may be of Native American origin are subject to special federal guidelines. Guidelines for all of these activities, and suggestions regarding the appropriate oversight committees, are found in the Office of Research Compliance.

The purpose of a university is to develop and transmit knowledge. Consistent with this purpose, Kansas State University is committed to making ideas and research results available to all who might wish to use them. Therefore, by university policy, classified research may not be carried out under university auspices by any faculty member, staff, or student. Classified research is broadly defined as research in which the purpose, the investigators, the research procedures, or the results are kept secret for an indefinite period of time, and with the control of their release or publication resting in an agency other than the university.

Below is a partial list of research facilities and centers at Kansas State University. For a more complete listing contact Research and Sponsored Programs at 785-532-6195 or website *http://www.ksu.edu/research*.

Advanced Manufacturing Institute

Home page: http://www.amiksu.org
E-mail: ami@ksu.edu

The Advanced Manufacturing Institute assits in economic development in Kansas by helping manufacturers become familiar with and adopt advanced technologies. Through research, technology transfer and technical assistance AMI helps small and medium sized manufacturing companies becomc more competitive nationally and internationally. AMI's interdisciplinary research teams consisting of faculty from various university departments work at developing advanced technology that is vital to manufacturing enterprises.

Companies and individuals working with AMI benefit by taking advantage of AMI's professional staff and facilities as well as Kansas State University's faculty expertise and resources to assist them in their manufacturing research and development activities. AMI is a KTEC-funded Center of Excellence. AMI also presents a regular program of seminars and workshops on advanced technology.

Beach Museum of Art

701 Beach Lane, Manhattan, KS
E-mail: klwalk@ksu.edu

The Marianna Kistler Beach Museum of Art opened in October 1996. The 25,000 square-foot, award-winning building was designed by Moore and Andersson Architects of Austin, Texas. It was built with private funds, led by the gift of Ross and Marianna Beach of Hays, Kansas. It houses K-State's art collection, which was established in 1928 by Professor John Helm with the purchase of two large oil paintings by the Kansas artist Birger Sandzen. Since that time, the collection has grown to include approximately 1,500 works of art. From the collection's inception, the focus has been on 20th century American art, with a special emphasis on the works of Kansas and regional artists and the works of American printmakers. These features of the collection promise to make the Museum the premier center for the study and appreciation of regional painting and printmaking. Special collections includes works by John Steuart Curry, the *Life* magazine photographs of Gordon Parks, the Konza Prairie works of Patricia DuBose Duncan, and prints issued by the Associated American Artists print club.

The 9,000 squarc-foot gallery wing of the museum features five exhibition spaces for displaying the permanent collection and traveling exhibitions. The Crosby Kemper Educational center houses the 120-seat UMB Theatre and the LouAnn McKinnon Dunn Activity Center. A variety of educational programming is available to the university, public schools, and Manhattan community. The theatre may be used for lectures, films, seminars and receptions. The activity room has been designed for art workshops, family activities, artist demonstrations and small group meetings. A works examination Studio will allow scholars and visitors to view works of art not on exhibition. Additional resources include artists files, catalogue files, photographic files of the collection, and a lending resource library for teachers. Visit the museum's web page at www.ksu.edu/bma for more information and to view archived exhibitions.

Museum hours
Tuesday–Friday, 10 a.m.–4:30 p.m.
Thursday, 10 a.m.–8:30 p.m.
Saturday abd Sunday, 1 p.m.–4:30 p.m.
Closed on Mondays
Phone: 785-532-7718
Admission is free.

BioServe Space Technologies

Home page: http://www.ksu.edu/bioserve
E-mail: terryj@ksu.edu

The Division of Biology, in cooperation with Aerospace Engineering Sciences at the University of Colorado, has been selected by the National Aeronautics and Space Administration to lead BioServe Space Technologies, a NASA Center for the Commercial Development of Space. The division activities are focused on the life science application of the center, which adds a vast new dimension to the scientific education of future generations of students. This space training and research program gives biologists, students training in thc animal and plant sciences, engineers and others an awareness of opportunities in space sciences that will intellectually involve them in space missions of the future. Initial research projects are directed towards an understanding of many biological processes in microgravity. Projects also are focused on the application of the space environment in areas of significant market value, such as biotechnology and bioengineered pharmaceuticals, synthetic organ products and high efficiency agriproducts and agrigenetic materials. Faculty scientists and students participating in BioServe Space Technologies have an opportunity to conduct important research by NASA's reduced gravity program on the KC-135 aircraft, as well as on sounding rockets and space shuttles.

Biotechnology Core Facility

Home page: http://www.ksu.edu/bchem/biotech/corelab.html

The Biotechnology Core Laboratory was established to provide a number of centralized services to researchers at K-State and elsewhere. Significant university support from the deans of the College of Agriculture and the Graduate School has enabled us to offer a number of services at very competitive rates. Our services include: DNA/RNA oligonucleotide synthesis, peptide/protein synthesis, amino acid analysis, peptide/protein sequencing, peptide mapping, and MALDI-TOF mass spectrometry.

Center for Basic Cancer Research

Home page: http://www.ksu.edu/cancer.center
E-mail: terryj@ksu.edu

The Center for Basic Cancer Research sponsors numerous educational and research programs related to cancer studies at K-State. The center developed a cancer research award program designed specifically for undergraduate students. Funded entirely by private and corporate gifts, these research awards are given to deserving undergraduate students on a competitive basis. An integral part of the cancer center is the Anti-Cancer Drug Laboratory where studies are conducted on the cellular and molecular events associated with tumor promoters which, unfortunately, enhance cancer growth. Support is provided for graduate student and faculty travel, summer stipends, laboratory equiptment and supplies. These programs are interdisciplinary in nature and include faculty scientists in biology, biochemistry, chemistry, psychology, laboratory medicine, pathobiology, family services, foods and nutrition, and plant pathology. The unique administrative structure and the quality of the faculty scientists have made this multidisciplinary program both powerful and successful.

Center for Gravitational Studies in Cellular and Developmental Biology

The Division of Biology is the home of the Center for Gravitational Studies in Cellular and Developmental Biology. This center has been funded as a NASA Specialized Center for Research and Training in Gravitational Biology, as the Gravity as a Determinant in Cellular and Developmental Biology NASA-EPSCoR Program, and by individual NASA grants to center investigators. Research in this center is focused on the potential role of gravity on cell and developmental biology of both plant and animal systems. Investigations are based both on basic sciences and applications for long-term space travel. This center has a major emphasis on graduate and post-graduate training, offering a unique opportunity for student preparation in space life sciences.

Computing and Network Services

Home page: http://www.ksu.edu/cns
E-mail: cns@ksu.edu

Computing and Network Services (CNS) provides the computer and data networking infrastructure upon which users of K-State information technology resources depend. A Gigabit Ethernet campus network ensures high-performance connectivity to a variety of enterprise servers on campus, to the Internet, and to other faculty and information resources at research institutions and national laboratories over Internet2. As a charter member of Internet2, K-State is committed to supporting the research and education efforts of its faculty and graduate students through high-performance networks for collaboration and communication. As a member of the Great Plains Network consortium, K-State researchers enjoy high-speed network connections to universities in six Midwest states and the U.S. Geological Survey's Earth Resources Observation Systems (EROS) Data Center.

Enterprise servers managed by CNS provide a wide variety of services and applications for graduate esearch and education: World Wide Web, e-mail, office suites, Oracle database, GIS, CAD, programming languages, mathematical and statistical programs, a dedicated high-end computing facility, printing, file storage, and tape archiving.

Help is available at the InfoTech Help Desk located in Hale Library and managed by the Information Technology Assistance Center. On-campus access to these resources is available through numerous departmental networks and in university computing labs with Microsoft NT PCs and Sun workstations running Solaris Unix. All residence halls and married-student housing units are connected to the campus network. Off-campus access is provided through the Internet, Internet2, and through a dial-up service available from K-State Telecommunications.

Electronics Design Laboratory

Home page: http://www.ksu.edu/ksuedl

The Electronics Design Laboratory (EDL) provides full-time electrical engineering support for research and teaching at Kansas State University through the development of advanced instrumentation, data acquisition systems, sensors, and other high-end electronics. Established in 1996, EDL eases researchers' access to advanced electronics, assists with integrating electronics technology into research and teaching programs, and aids in electronics technology transfer to users by providing ongoing technical support. EDL works in cooperation with many diverse academic departments, allowing a symbiotic approach to problem solving.

By delegating technical electronics issues to EDL, investigators free themselves to focus more fully on core research objectives.

EDL is headed by an experienced electrical engineer, who supervises a full-time technical staff and a number of graduate and undergraduate interns. More information on EDL capabilities and services can be obtained at our web site.

Food Animal Health and Management Center

The center works to accomplish high quality and timely research directed to the needs of veterinary medicine's constituents in animal agriculture, allied health industries, governmental agencies, and the general public; to build research teams to efficiently and definitely address research questions; and to educate and train veterinary agricultural scientists. The primary focus of the center's research is applied on-farm research. Graduate education is focused on multidisciplinary health and management issues in animal agriculture, e.g., advanced diagnostics, food safety, quality assurance and epidemiology.

Hazardous Substance Research Center

Home page: http://www.engg.ksu.edu/HSRC

Kansas State University leads the consortium comprising the Great Plains/Rocky Mountain Hazardous Substance Research Center which serves Environmental Protection Agency (EPA) Regions 7 and 8. Other member universities are Colorado State, Haskell Indian

Nations, Lincoln, Montana State, South Dakota State, and Utah State Universities, along with the Universities of Iowa, Missouri, Montana, Nebraska, Northern Iowa, Utah, and Wyoming. The center was established in 1989 to conduct research pertaining to identification, treatment, and reduction of hazardous substances resulting from agriculture, forestry, mining, mineral processing, and other activities of local interest. In 1994 efforts of principal investigators were broadened to include programs for minority academic institutions, technical outreach services for communities, and research and re-education for displaced military and Department of Defense personnel.

The center has undertaken research in the following areas: studies of soil and water contamination by heavy metals and mining wastes; research on soil and groundwater contamination from a variety of sources; development of biodegradation and immobilization technology; development of simplified and inexpensive methods for analyzing contaminated soil; hazardous waste minimization; and determination of safe concentration levels of hazardous substances in soil and water.

Diversity of interests in EPA Regions 7 and 8 and the large geographic area represented are further reflected in the training and technology transfer program the center currently supports. Issues of the center newsletter HazTech Transfer have been widely disseminated across the nation; an information clearinghouse at Kansas State University Hale Library has been established and contains over 1,000 publications, including center-funded theses, dissertations, reports, and videos; the center has held annual conferences on hazardous waste research since 1986 with more than 70 papers presented at each conference; and general public environmental information activities are ongoing. Many center publications, including proceedings of the 1995–1998 conferences, are now available on our web site.

Huck Boyd National Center for Community Media

Home page: http://huckboyd.jmc.ksu.edu

The Huck Boyd National Center for Community Media was founded in 1990 to serve and strengthen the local newspapers, radio stations, cable systems, and other media that play a key role in the survival and revitalization of America's small towns. The center's mission is to assist in sustaining and enhancing the positive qualities of life characteristic of small communities in America through strengthening community media.

Kansas Center for Agricultural Resources and the Environment (KCARE)

Home page: http://www.ksu.edu/kcare
E-mail: kcare@ksu.edu

KCARE helps Kansans balance "utilization" and "protection" of natural resources today and into the future. The health and prosperity of future generations depends on a mutually beneficial relationship between agriculture, natural resources, the environment and consumers. The Kansas Center for Agricultural Resoruces and the Environment was established to coordinate and enhance research, extension, and teaching activities pertaining to environmental issues related to agriculture.

KCARE's roles are to foster interdisciplinary team approaches to solve environmental problems related to agriculture; serve as a liaison for state and federal agencies, non-governmnt organizations and private groups outside K-State; communicate the relationship of agriculture and the environment to producers and the public; and develop financial resources for interdisciplinary research, extension and communications activities at the center.

KCARE focuses on soil quality, waste management, water management, and water quality.

Kansas Center for Rural Initiatives

Home page: http://www.ksu.edu/kcri
E-mail: kcri@ksu.edu

The purpose of the Kansas Center for Rural Initiatives (KCRI) is to link the resources of the university with rural Kansans. Through KCRI, K-State faculty have worked as technical consultants, evaluators, presenters, researchers, mentors, and facilitators in a broad participatory effort that has assisted in expanding the concept of the "land grant" across the university. To date, more than 150 faculty have worked in various roles with KCRI. KCRI has developed partnerships with Kansas communities in leadership development and community action programs. K-State students work with KCRI to apply their academic knowledge to projects designed by Kansas communities. KCRI has been instrumental in the development of the Kansas Microenterprise Initiative, which is a collaborative project between several state agencies, regional planning and development organizations, local communities and counties, and individuals. KCRI is also a jointly funded university center by the Economic Development Administration with the University of Kansas' Institute for Public Policy and Business Research. Support from this project has allowed the two universities to work collaboratively on providing technical assistance to communities through consultations, workshops, conferences, and information dissemination and to conduct applied research related to economic and community development in Kansas.

Kansas Regents Educational Communication Center

Home page: http://www.ksu.edu/ecc

Housed in Bob Dole Hall, the Kansas Regents Educational Communications Center is a state-of-the-art multimedia, video and Internet-based production and distribution facility. Made possible in the late 1980s by a grant from the U.S. Department of Education, its goal is to extend the educational resources of the State of Kansas to its residents and beyond. Center resources and services are designed to support the higher education needs of Kansas State University and the other regents system institutions, as well as interactions with professional associations and business and industry, to nurture economic growth and development in Kansas. These objectives are pursued through a development of multimedia courseware for on-campus and distant learners, live educational programming to public schools nationwide, electronic classroom development for live and asynchronous presentation of courses and review sessions, and both desktop and full-motion video conferencing. Competencies range from CD-ROM, DVD, and web-based experience creation to full studio or remote-location analog and digital production, editing, and distribution. Campus-based and mobile production and satellite uplink facilities, supported by several compressed video technologies enable multiple production and distribution options and combinations.

Other occupants of Dole Hall include: faculty members from A.Q. Miller School of Journalism and Mass Communications, who teach studio-based and electronic journalism production courses through the use of center facilities; the television section of Cooperative Extension, producing and distributing video information to county agents and their constituents throughout the state; the Kansas Regents Network, operators of the dedicated audio network for the state, as well as Telenet2, the desktop video network for Kansas.

Kansas Water Resources Research Institute (KWRRI)

The Kansas Water Resources Research Institute is part of a national network of research institutes in every state and trust territory of the U.S. established by law in the Water Resources Research Act of 1964. The network is funded by a combination of federal funds through the U.S. Geological Survey and non-federal funds from state and other sources. The mission of KWRRI is to develop and support research on the high-priority water resources problems of the state, to foster the dissemination and application of research results, and to facilitate effective communication amongst water resources professions in Kansas. The mission is accomplished through: (1) Supporting research through a competitive grants program that encourages interdisciplinary approaches, interagency collaboration, scientific innovation, cost-effectiveness, relevance to present and future water resource issues/problems as identified in the state water plan, and dissemination and interpretation of results to appropriate audiences; (2) Fostering dissemination and application of results through conferences, briefings, white papers, and/or newsletters; and (3) Facilitating communication through an electronic network. KWRRI currently is administratively under the Kansas Center for Agricultural Resources and the Environment (KCARE) at Kansas State University.

Konza Prairie

Home page: http://www.ksu.edu/konza
E-mail: konza@ksu.edu

Konza Prairie Research Natural Area (KPRNA) is a 3,487 hectare tallgrass prairie preserve owned by The Nature Conservancy and Kansas State University and operated as a field research station by the Division of Biology. The station is dedicated to a three-fold mission of long-term ecological research, education, and prairie conservation. It is a unique outdoor laboratory that provides opportunities for the study of tallgrass prairie ecosystems and for basic biological research. The station is open to scientists and students from throughout the world. It also serves as a "benchmark" for comparisons with areas that have been affected by human activities, and as an environmental education facility for students and the public. KPRNA is a member of the Organization of Biological Field Stations and the Association of Ecosystem Research Centers and is a National Science Foundation Long-Term Ecological Research (LTER) site.

Libraries

Home page: http://www.lib.ksu.edu/

Kansas State University Libraries provides support for the educational, research, extension, and public service objectives of K-State. Staff acquires and maintains the libraries' electronic and print collection needed for the University to achieve its objectives.

KSU Libraries consists of four libraries: Hale Library, Weigel Library of Architecture, Planning and Design (Seaton Hall), Math/Physics Library (Cardwell Hall), and Veterinary Medicine Library (Trotter Hall). A fifth Manhattan campus library, Fiedler Engineering Library, is under construction. K-State Salina Library Media Services is a cooperating library that shares integrated electronic access systems and databases.

Reference staff provides assistance in helping patrons access materials or information needed. Staff help initiate literature searches and assist with electronic resources. Librarians, in addition to their reference staff duties, serve as subject specialists. Subject specialists, who are knowledgeable of the resources in a specific subject matter, assist patrons with their particular information needs. Subject specialists are available for one-on-one consultations or for groups and classes.

KSU Libraries offers state-of-the-art electronic data information retrieval systems for the catalog and databases unique for K-State's diverse academic areas. The libraries' website, *http://www.lib.ksu.edu,* provides information about collections and services. An extensive section is devoted to electronic information available to K-State and around the world. Remote access to the libraries' electronic resources are available to K-State students.

Hale Library, the main library, maintains more that 100 computer terminals for patrons to search , find and fulfill their information needs. Other areas in Hale Library providing information or access services include circulation, interlibrary services, government documents, microforms, and reserves. A 24-hour study area is available on the first floor, including the Bookplate Cafe. Most services available at Hale Library are also available at the branch libraries.

The largest academic building on campus with nearly 400,000 square feet and centrally located on the Manhattan campus, Hale Library is the academic heart of Kansas State University.

Multicultural Research and Resources Center

Home page: http://www.lib.ksu.edu/depts/mrcc/mrcc.html

The Multicultural Research and Resource Center (MRRC) provides research and instructional services in support of the K-State's American ethnic studies program. Research emphasis is placed on the following ethnic groups: African Americans, Hispanic Americans, Native Americans, and Asian Americans. MRRC features a reference collection of encylopedias, dictionaries, and indexes related to various American ethnic groups; magazines and periodicals; and multicultural and international newspapers. Visitors can view displays showcasing the university's unique multicultural activities and programs.

Nuclear Reactor

Home page: http://www.mne.ksu.edu/reactor.html

The university operates a TRIGA Mark II nuclear reactor and related laboratories. Inherently safe by design, the reactor normally operates at 250 kW, but can be pulsed to peak power levels of 250 MW. Researchers throughout the world use the reactor for neutron activation analysis, neutron radiography, fission track studies, neutron spectroscopy, and isotope geochronology. The reactor is also used for student education and public demonstrations.

Particle Accelerators: J. R. Macdonald Laboratory

Kansas State University operates a national user facility, the James R. Macdonald Laboratory, which is supported by the U. S. Department of Energy. The laboratory has ion sources and particle accelerators that provide highly stripped heavy ions over an energy range of a few eV to the order of 100 MeV. This facility is dedicated to the investigation of the interactions of highly charged heavy ions with atoms, ions, molecules, and surfaces. The equipment available to researchers includes a 7MV tandem Van de Graaff accelerator, a superconducting LINAC (booster/decelerator), an ion source for the production of highly charged low velocity heavy ions (CRYEBIS), a crossed beam ion-ion collisions facility, and five independent multiparameter data acquisition/analysis systems.

The laboratory provides high-level technical support to aid users in the design, construction, and implementation of experimental projects. The laboratory is unique in its ability to provide long term access to state-of-the-art complex experimental apparatus related to ion collision studies.

Pollution Prevention Center

Home page: http://www.engg.ksu.edu/enggext/ppi

This institute provices free, confidential technical assistance and training in source reduction and other environmentally sound practices to businesses, regulatory agencies, technical assistance groups, and private citizens throughout the Midwest. The institute also serves as a meeting ground for faculty involved in pollution and other related activities.

Sensory Analysis Center

The Sensory Analysis Center, a part of the College of Human Ecology, is one of the outstanding providers of sensory services in the nation. The center assists in teaching sensory analysis by providing students with opportunities to gain practical experiences and it provides outstanding research capabilities for university researchers and consumer products industries. Clients of the center have included researchers on campus from numerous departments, Kansas businesses, and national and international corporations. The center provides two major types of analyses: (1) descriptive analysis that defines the characteristics of a product or service and the amount or intensity of that characteristics, and (2) consumer evaluation that provides information on benefits, liking, or acceptance or helps to determine what consumers understand about the product, service, or information.

Small Business Development Center

The Small Business Development Center, one of 10 regional centers in Kansas, offers free one-on-one confidential business counseling for small businesses that wish to start or purchase a new business, and existing businesses that wish to develop and market new and existing products.

Small Business Institute

The Small Business Institute links teams of senior business students working under the supervision of a faculty member with local small business owners seeking research and analysis of business problems. The teams then work closely with the business owner and a faculty member to provide assistance in solving those problems.

Technology Center for Aviation

Home page: http://www.sal.ksu.edu/~/aero/default.htm
E-mail: pkennedy@sal.ksu.edu

The College of Technology and Aviation, located at the Salina campus, has extensive outreach and instructional programs in engineering technology, including FAA-certified flight instruction for domestic and international pilots, and for professional and commercial pilots. The college also operates a global positioning base station for federal and state agencies and utilizes that in conjunction with research programs with a number of industrial sponsors. The college also offers an associate degree for students involved in repair and installation of electronic navigation systems in aircraft.

Transportation Research Center

Faculty members with the Center for Transportation Research and Training perform interdisciplinary mission-oriented research and training concerning national, regional, state, and local transportation problems. A major activity is the K-TRAN program, which is an ongoing cooperative and comprehensive research program funded by the Kansas Department of Transportation addressing transportation needs of the state. It utilizes academic and research resources from the Kansas Department of Transportation, Kansas State University, and the University of Kansas. The CTRT is a member of the Mid-America Transportation Center, a consortium of six universities, and shares in the $1 million annual federal funding. The center is also a member of the Council of University Transportation Center, a national organization of transportation centers.

Wheat Research Center

Home page:http://www.oznet.ksu.edu/pr_wrc/
E-mail:wrc@oz.oznet.ksu.edu

Kansas State University hosts a center of excellence for wheat research and technology transfer encompassing wheat breeding and genetics, wheat production, wheat harvesting and storage, marketing, grain quality and processing, human and animal nutrition, pest management, wheat utilization for food and non-food products, and worldwide data dissemination. Current programs address issues essential to production efficiency and profitability, value-added product development, food safety, biotechnology, and environmental quality. The center cooperates with the American Institute of Baking, the USDA Grain Marketing Research Laboratory, other land grant universities, wheat producer groups, wheat merchandising and processing firms, seed and other input supply firms, and universities and research institutes worldwide.

Course Description Key and Glossary

Course Descriptions

The following course description key explains the system used for courses listed throughout the catalog.

Sample course description

ECON 810. History of Economic Thought. (3) I. Development of economic ideas and doctrines and the relation of these to conditions existing when they were formulated. Pr: ECON 110.

• The letters *ECON* denote the department in which the course is offered (in this case, Economics).

• The three digits of the course number *810* represent the level of the course.

• *Level numbers:*

000–099	Not applicable toward degree requirements.
100–299	Lower division undergraduate. Designed as freshman or sophomore course.
300–499	Upper division undergraduate. Designed as junior or senior course.
500–699	Upper division undergraduate. Primarily for a junior or senior. A 500 level course may be taken for graduate credit only in a minor field. A course numbered 600 may be taken for credit in a graduate student's major.
700–799	Graduate and upper division, primarily for graduate level.
800–899	Graduate level for master's course or professional course beyond the undergraduate level.
900–999	Graduate level, primarily for doctoral candidate.

• The number in parenthesis *(3)* following the course title indicates the units of credit given for the course. Each credit unit usually represents one 50-minute period of lecture or recitation each week of the semester.

• The *I, II, S,* and/or *intersession* following the course title indicate the semester, or semesters, each course is usually offered; I stands for fall semester, II for spring, S for summer school, and intersession for the term between semesters.

• The abbreviation *Pr.* indicates prerequisites for the course. In the sample course, students would be required to have completed ECON 110 before enrolling for ECON 810. Some courses may allow or require concurrent enrollment in other courses This is indicated by the abbreviation *Conc.*

Glossary and Abbreviations

A/Pass/F: An alternative grading option in which a student earning a grade of A in a course will have an A recorded for that course; a grade of B, C, or D will be recorded as a Pass; and a grade of F will be recorded as an F.

Academic load: The total number of semester hours for which a student is enrolled in one semester.

Advanced standing: Having credit awarded for previous work or testing.

Advisor: A faculty member who provides information and makes recommendations on courses, requirements, prerequisites, and programs of study.

Audit: To attend a class regularly without participating in class work and without receiving credit.

B.A.: Bachelor of arts degree. Courses selected from a variety of disciplines although concentrations are in one or two areas. A modern language is required for a B.A. degree.

B.S.: Bachelor of science degree. A specified program of required courses with fewer electives than the B.A. A modern language may be taken but is not required.

Baccalaureate: Refers to the bachelor's degree.

Classification: Level of progress toward a degree with classifications of freshman, sophomore, junior, or senior, depending on the number of semester hours completed.

College: An academic unit of the university. Kansas State University has nine colleges and a Graduate School.

Concurrent enrollment: Taking a course during the same semester as another. Abbreviation: Conc.

Course: A unit of study a student enrolls in during a semester.

Credit by examination: Credit received when a student takes an oral or written examination without registering for a course.

Credit hour: A unit of measurement used in determining the quantity of work taken. Each credit hour is roughly equivalent to one hour of class time per week. For example, a class meeting three hours a week would be a three-credit-hour class. Abbreviation: Cr.

Credit/No Credit: A grading option in which the successful completion of a course is recorded as Credit and failure is recorded as No Credit. No other grades are given for such courses and they are not figured into the grade point average.

Curriculum: A program of courses that meets the requirements for a degree in a particular field of study.

Degree program: Courses required for completion of a particular degree.

Department: A unit within a college representing a discipline.

Discipline: An area of study representing a branch of knowledge, such as mathematics.

Dismissal: A student who neglects his or her academic responsibilities may be dismissed on recommendation of an academic dean.

Double major: Having two programs of academic study.

Drop/Add: Changing the student's course schedule by adding and/or dropping a course, or both.

Dual degree: A student may elect in some cases to earn two degrees at one time.

Ed.D.: Doctor of Education degree. A post-baccalaureate degree awarded upon completion of at least three years of full-time specialized study, together with a major research contribution to the field of education that demonstrates independence as a scholar. The degree culminates with a formal dissertation.

Electives: Courses chosen that are not required for the major or minor. The number of hours of electives required varies according to a student's major.

Enrollment: The process of selecting courses and having courses reserved.

Equiv.: Equivalent.

Extracurricular: Activities such as band or debate for which a student may earn credit toward graduation. Extracurricular activities are counted as electives.

Financial aid: Help for a student who needs assistance to pay for college. Aid is available from grants, loans, scholarships, and work/study employment.

Grade point average (GPA): A measure of scholastic performance. A GPA is obtained by dividing the number of grade points by the hours of work attempted, an A = 4 points, a B = 3 points, a C = 2 points, a D = 1 point, and an F = 0 points.

Graduate student: A student who has completed a bachelor's degree and has met all the requirements for admission to the Graduate School.

Hour: The unit by which course work is measured. The number of semester hours assigned to a course is usually determined by the number of hours a class meets per week.

Intersession: Courses offered between semesters.

Lec.: Lecture. A class wherein the teaching is done primarily through oration.

M.A.: Master of arts degree. A post-baccalaureate degree awarded upon completion of at least 30 semester hours of graduate credit, usually in the humanities or social sciences. May or may not include research and a thesis, depending on the field of study.

Major: The subject or subject areas upon which a student chooses to place principal academic emphasis.

M.S.: Master of science degree. A post-baccalaureate degree awarded upon completion of at least 30 semester hours of graduate credit, usually in the sciences or professions. Research and a thesis are required in most of the sciences.

Non-degree seeking student: A graduate student taking courses at K-State but not admitted to a graduate program leading to a degree.

Option: An approved group of courses creating a specialty within a major field of study.

Orientation: Activities and programs designed to help the new student become acquainted with the university.

Ph.D.: Doctor of philosophy degree. A post-baccalaureate degree awarded upon completion of at least three years of full-time specialized study, together with a major research contribution to the discipline that demonstrates independence as a scholar. The degree culminates with a formal dissertation.

Prerequisite: A requirement, usually credit in another course, which must be met before a particular course can be taken. Abbreviation: Pr.

Probation: Probation is an academic warning that a student is in academic difficulty which could lead to dismissal from the university.

Rec.: Recitation. A small section usually taken in conjunction with a lecture.

Scholastic honors: An award an undergraduate receives based on the excellence of K-State academic work.

Secondary major: Interdisciplinary major which must be completed along with a first major course of study.

Transcript: An official copy of a student's permanent academic record.

Transfer student: A student who terminates enrollment in another college or university and subsequently enrolls at K-State.

Undergraduate student: A university student who has not received a bachelor's degree.

V/Var.: Variable. The credits earned in some courses may vary.

Graduate Degree Programs

Accounting

Head
O. Finley Graves

Director of graduate studies
Cynthia McCahon, Assistant Dean

Graduate faculty
Dan Deines, Ph.D., University of Nebraska.

David P. Donnelly, Ph.D., University of Illinois.

Dann Fisher, Ph.D., University of Missouri.

O. Finley Graves, Head, Department of Accounting, Ph.D., University of Alabama.

Stacy Kovar, Ph.D., Oklahoma State University (Associate Member).

Richard L. Ott, Ph.D., Texas Tech University.

Jeffrey J. Quirin, Ph.D., University of Nebraska.

Lynn Thomas, Ph.D., University of Kansas.

David R. Vruwink, Ph.D., University of Arkansas.

Master of accountancy program

The MAcc curriculum is a 30-credit-hour program of study that may be completed in two regular semesters and a summer term or in three semesters. Students without prior or complete business and accounting training must acquire basic competency in the following business core foundation areas: accounting, statistics, management information systems, economics, finance, marketing, and management. These competencies may be acquired through specified business core foundation course work. The specific number of business core foundation courses required depends on the applicant's prior academic work. The basic competency course work may be taken after admission to the MAcc program, but certain business core foundation courses must be completed prior to taking MAcc courses that are in the same subject or that otherwise require a knowledge of the business core foundation material.

The objective of the master of accountancy program is to provide candidates with a greater breadth and depth in accounting than is possible in the baccalaureate or master of business administration program in preparation for careers as professional accountants in financial institutions, government, industry, nonprofit organizations, and public practice. For complete application information, see the College of Business Administration website.

Accounting courses

Undergraduate and graduate credit

ACCTG 731. Advanced Financial Reporting. (3) I. An examination of the reporting requirements of large (often multinational) corporations, e.g., foreign currency translation, interim and segment reporting, and business combinations. Pr.: ACCTG 433.

Graduate credit

ACCTG 810. Accounting Concepts and Analysis. (3) I. A study of the nature of business transactions; identifying relevant economic events for reporting; determining the most appropriate financial measures for those events; and analyzing the effects of those events on firm performance and financial condition. Pr.: MATH 205.

ACCTG 832. Advanced Auditing. (3) I. An in-depth exposure to authoritative auditing pronouncements and specialized topics, e.g., statistical methods, EDP auditing, internal auditing, operational auditing, and audit management. Pr.: ACCTG 442 and 642.

ACCTG 833. Corporate Taxation. (3) I. A study of federal and state taxation of corporations with emphasis on case analysis and tax planning. Pr.: ACCTG 342 and 642.

ACCTG 834. Partnership Taxation. (3) I. Intensive study of the federal taxation of partnerships and S corporations. Pr.: ACCTG 342 and 642.

ACCTG 835. Advanced Management Accounting. (3) I. A study of traditional management accounting systems and their limitations with emphasis on newly developed systems. Pr.: ACCTG 432.

ACCTG 841. Advanced Accounting Theory. (3) On sufficient demand. A critical examination of accounting theory with emphasis upon information economics, agency theory, and capital market information. Pr.: ACCTG 641.

ACCTG 842. Estate and Gift Taxation. (3) II. Intensive examination of the federal taxation of estates and gifts. Emphasis on research and tax planning. Pr.: ACCTG 342 and 642.

ACCTG 843. Management Accounting and Behavior. (3) On sufficient demand. An investigation of human behavior effects on the collection and use of management accounting information. Pr.: ACCTG 432.

ACCTG 844. Advanced Accounting Information Systems. (3) II. An in-depth study of accounting information systems focusing on current means of capturing, storing, processing, and retrieving accounting data. Important issues include: designing data base structures for control, access, and auditability; design and analysis of the system controls found in complex EDP systems, decision support, and expert systems in accounting. Pr.: ACCTG 331.

ACCTG 845. International Accounting. (3) II. An examination of comparative international accounting systems, efforts to harmonize accounting standards internationally, problems of international financial analysis, and accounting issues of particular relevance to U.S. multinational enterprises. Pr.: ACCTG 641 and ACCTG 731.

ACCTG 860. Management Accounting and Business Problem Solving. (3) I. A study of managerial accounting information for decision making, planning, and control. Pr.: ACCTG 810, ECON 815, FINAN 815, MANGT 810, MANGT 820, MANGT 830, MKTIB 810 and STAT 702.

For more information

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Adult and Continuing Education

Chair
Robert C. Newhouse

Graduate faculty
David R. Byrne, Ph.D., University of Utah.

Mary Evan Griffith, Ph.D., Ohio State University.

Nancy Nelson Knupfer, Ph.D., University of Wisconsin–Madison.

Charles E. Litz, Ph.D., University of Michigan.

Diane McGrath, Ph.D., University of Illinois.

Kevin Murry, Ph.D., Texas Tech University.

Robert C. Newhouse, Ph.D., University of Oregon.

Charles R. Oaklief, Ph.D., Wisconsin State University and Ohio State University.

Thomas Parish, Ph.D., University of Illinois.

Cheryl J. Polson, Ph.D., Kansas State University.

Charles I. Rankin, Ph.D., Kansas State University.

Tweed Ross, Ed.D., Kansas State University.

Susan Slusarski, Ph.D., Syracuse University.

Jacqueline Spears, Ph.D., Kansas State University.

W. Franklin Spikes, Ed.D., Northern Illinois University.

Emmett L. Wright, Ph.D., Pennsylvania State University.

This degree is offered through the Department of Foundations and Adult Education.

Program

The faculty of adult and continuing education offer three graduate programs: (1) a master's degree in adult and continuing education designed to prepare practitioners for careers in a variety of adult education settings; (2) a Ph.D. in adult and continuing education designed to prepare scholars for careers in college and university settings; and (3) an Ed.D. in adult and continuing education that provides advanced education and experience to prepare people for business, industry, government, health services, community agencies, and careers in two- and four-year colleges and universities. Courses focus on issues related to planning, developing, delivering, or facilitating instruction for adult learners.

The graduate programs are compatible with a variety of delivery settings where the following specializations and support areas are required or desired: adult and continuing education, extension education, human resource development, community education and development, and institutions, agencies, and organizations that deal primarily with adult needs and education.

Master's degree requirements

Curriculum
36 hours required

Core courses (all courses are required, 12 hours)
EDACE 780 Introduction to Adult Education
EDACE 790 Characteristics of the Adult Learner
EDACE 830 Program Planning in Adult Education
EDACE 886 Seminar: Social Foundations of Adult Education

Professional courses (12 hours from the following)
EDACE 704 Extension Organization and Programs
EDACE 706 Principles of Teaching Adults in Extension
EDACE 714 International Education
EDACE 725 Adult Basic Education Techniques
EDACE 750 Women, Education, and Work
EDACE 754 Adult Basic Education
EDACE 782 Educational Gerontology
EDACE 786 Topics: Adult and Continuing Education
EDACE 792 Hospital and Industry Adult Education
EDACE 811 Consumer Education
EDACE 815 Introduction to Community Educational Development
EDACE 820 Advanced Methods in Teaching Adults
EDACE 825 Theory and Practice of Continuing Education
EDACE 860 Nontraditional Study for Adults
EDACE 886 Seminars: Adult and Continuing Education

Research courses (3–9 hours)
Required (3 credits):
EDCEP 816 Research Methods and Treatment of Data

Additional options:
EDACE 898 Master's Report (Report Plan)
EDACE 899 Master's Research (Thesis Plan)

Experiential and individualized courses (0–6 hours)
Within this degree, students may take no more than 6 hours of individualized work such as readings, problems, or practicum. No more than 3 hours can be practicum.
EDACE 733 Practicum in Adult and Continuing Education
EDACE 775 Readings: Adult and Continuing Education
EDACE 795 Problems: Adult and Continuing Education

Human resource development (0–6 hours)
EDACE 786 Topics: Principles of Human Resource Development (HRD)
EDACE 886 Seminar: Instructional Design in HRD
EDACE 886 Seminar: Policy Development and Implementation in HRD

Ph.D. requirements

Curriculum

The doctor of philosophy degree in adult and continuing education is a minimum 90-credit hour, post baccalaureate program designed to prepare scholars who are committed to a career with responsibilities and requirements associated with college/university faculty membership and/or interest in the development of knowledge, theory, and research.

Prerequisite core courses (12 hours)
Students entering the Ph.D. program without prior knowledge and course work in adult and continuing education are required to take the core courses in addition to the regular program. The core courses should be completed before foundation and professional or specialized courses are taken.

EDACE 780 Introduction to Adult Education
EDACE 790 Characteristics of the Adult Learner
EDACE 830 Program Planning in Adult Education
EDACE 886 Seminar: Social Foundations of Adult Education

Degree requirements (90 hours)
Required courses are marked with an asterisk.

Adult learning and programming (6 hours minimum)
EDACE 706 Principles of Teaching Adults in Extension
EDACE 782 Educational Gerontology
EDACE 786 Topics: Adult and Continuing Education
EDACE 815 Introduction to Community Educational Development
EDACE 820 Advanced Methods in Adult Teaching
EDACE 860 Nontraditional Studies for Adults
EDACE 886 Seminars: Adult and Continuing Education

Organization, administration, and supervision (3 hours minimum)
EDACE 704 Extension Organization and Programs
EDACE 792 Hospital and Industry Adult Education
EDACE 825 Theory and Practice of Continuing Education
EDACE 937 Organization and Administration of Adult Education*

Human resource development (0–6 hours)
EDACE 786 Topics: Principles of Human Resource Development
EDACE 886 Seminar: Instructional Design in HRD
EDACE 886 Seminar: Policy Development and Implementation in HRD

Supporting courses (0–6 hours)
EDACE 714 International Education
EDACE 725 Adult Basic Education Techniques
EDACE 750 Women, Education, and Work
EDACE 754 Adult Basic Education
EDACE 791 Career Education
EDACE 811 Consumer Education

Foundations (6 hours)
EDACE 916 Foundations of Adult Education*
EDACE 986 Advanced Seminars in Adult Education*

Research courses (9 hours minimum)
EDCEP 816 Research Methods & Treatment of Data*
EDCEP 817 Statistical Methods in Education*
EDCEP 917 Experimental Design in Educational Research*

Doctoral research (30 hours minimum)
EDACE 999 Doctoral Research in Adult and Continuing Education (30 hours)*

Experiential and individual courses (0–6 hours)
Students may have no more than 6 hours of individualized work such as readings (775) and problems (795). No more than 3 hours of which must be practicum (including those courses from the master's program).
EDACE 733 Practicum in Adult and Continuing Education
EDACE 775 Readings in Adult and Continuing Education
EDACE 795 Problems in Adult and Continuing Education
EDACE 991 Internship in Adult and Continuing Education

Internship: Students may complete an internship of 3–6 hours in the Ph.D. program. The internship will replace part or all of the experiential and individualized course credit.

Residency

An academic residency is required and is satisfied with 24 hours of course work completed within 12 calendar months.

Preliminary examination

Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study.

Ed.D. requirements

Curriculum

The doctor of education degree in adult and continuing education is a minimum 94-credit hour post baccalaureate program designed to prepare professionals to work in a variety of delivery systems. The Ed.D. degree provides advanced education and experience to prepare people for work in education, business, industry, government, health services, community agencies, community colleges, four-year colleges and universities, as well as many professional areas.

Prerequisite core courses (12 hours)
Students entering the Ed.D. program without prior knowledge and coursework in adult and continuing education are required to take the core courses in addition to the regular program. The core courses should be completed before foundation and professional or specialized courses are taken.

EDACE 780 Introduction to Adult Education
EDACE 790 Characteristics of the Adult Learner
EDACE 830 Program Planning in Adult Education
EDACE 886 Seminar: Social Foundations of Adult Education

Degree requirements (94 hours)
Required courses are marked with an asterisk.

Adult learning and programming (6 hours minimum)
EDACE 706 Principles of Teaching Adults in Extension
EDACE 782 Educational Gerontology
EDACE 786 Topics in Adult Education
EDACE 815 Introduction to Community Educational Development
EDACE 820 Advanced Methods in Adult Teaching
EDACE 860 Nontraditional Studies for Adults
EDACE 886 Seminar: Self-Directed Learning
EDACE 886 Seminars in ACE, HRD, Extension, others

Organization, administration, and supervision (3 hours minimum)
EDACE 704 Extension Organization and Programs
EDACE 792 Hospital and Industry Adult Education
EDACE 825 Theory and Practice of Continuing Education
EDACE 937 Organization and Administration of Adult Education*
EDACE 986 Advanced Seminars in Adult Education

Human resource development (0–6 hours)
EDACE 786 Topics: Principles of Human Resource Development
EDACE 886 Seminar: Instructional Design in Human Resource Development
EDACE 886 Seminar: Policy Development and Implementation in Human Resource Development

Supporting courses (0–6 hours)
EDACE 714 International Education
EDACE 725 Adult Basic Education Techniques
EDACE 750 Women, Education, and Work
EDACE 754 Adult Basic Education
EDACE 791 Career Education
EDACE 811 Consumer Education

Foundations of education (12 hours)
Ed.D. students are required to take 12 hours of the following foundations courses or their equivalent. Courses must be approved by the Ed.D. supervisory committee.

EDADL 811 Philosophy of Education
EDCEP 816 Research Methods & Treatment of Data
or
EDADL 886 Seminar: Historical and Philosophical Analysis of Education
EDCIP 910 Multicultural Curriculum Programming
EDCEP 912 Psychological Bases of Educational Thought and Practice
or
EDACE 916 Foundations of Adult Education

Research courses (6 hours minimum)
EDCEP 817 Statistical Methods in Education
EDCEP 819 Survey Research

EDCEP 917	Experimental Design in Educational Research
SOCIO 724	Qualitative Methodology

Doctoral research (16 hours)
EDACE 999 Doctoral Research (16 hours)*

Residency
An academic residency is required and can be completed with one of the following options: four summers within a five-year period in which 24 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six additional hours of course work completed in one intervening semester; or 24 hours of course work completed with 12 calendar months.

Preliminary examination
Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study.

Adult and continuing education courses

Undergraduate and graduate credit in minor field
EDACE 502. Independent Study in Foundations and Adult Education. (1–3) I, II. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

Undergraduate and graduate credit
EDACE 704. Extension Organization and Programs. (3) Development and objectives of Cooperative Extension and other university adult education programs; with emphasis on programs and procedures. Cross-listed as EDSEC/ EDACE 704. Pr.: Consent of instructor.

EDACE 706. Principles of Teaching Adults in Extension. (3) Methods and principles of adult teaching, with emphasis on Cooperative Extension Service; application to various adult education programs. Cross-listed as EDSEC/ EDACE 706. Pr.: Senior standing, juniors by consent of instructor.

EDACE 713. Occupational Analysis. (2–3) An introduction to various techniques used in analyzing occupations and jobs. Emphasis on developing and organizing related instructional materials content. Cross-listed with EDACE/ EDSEC 713. Pr.: or conc.: EDSEC 620.

EDACE 714. International Education. (3) Contemporary overview of the field of international education and an introduction to three of its parts. comparative education, intercultural education, and development education.

EDACE 725. Adult Basic Education Techniques. (3) On sufficient demand. Emphasis on providing students with an understanding of the selection, utilization, and development of adult basic education reference, resources, and other materials.

EDACE 733. Practicum in Adult Education. (1–6) On sufficient demand. Related occupational or professional experiences in approved industry, school, Cooperative Extension Service, or similar agency setting under faculty supervision. Pr.: Consent of instructor.

EDACE 738. Occupations in Business Industry.

EDACE 739. Coordination of Cooperative Vocational Education. (2–3) Emphasis on the legal aspects and other minimum requirements essential to conducting cooperative vocational education programs at the secondary and post-secondary levels. Pr. or conc.: EDSEC 620.

EDACE 750. Women, Education, and Work. (2–3) Emphasizes the collective and individual educational needs of women in and out of the work force and the part that occupational/educational preparation contributes to their participation in the work force.

EDACE 753. Introduction to Occupational Education. (3) Overview of occupational education at all levels and its role in society. Designed for administrators, counselors, and vocational educators who perform a leadership function involving occupational education programs. Pr.: Teaching experience or consent of instructor.

EDACE 754. Adult Basic Education. (3) Evolving adult basic and high school equivalency education concepts will be examined. Program implementation, supervision, methods, and materials are emphasized. Pr.: Adult teaching experience or consent of instructor.

EDACE 775. Readings in Foundations and Adult Education. (1–3) Readings in research and application in specialized areas in education. May be taken more than once. Pr.: Consent of Instructor.

EDACE 780. Introduction to Adult Education. (3) A survey of adult education. Consideration given to articulation with other levels of education. Identification of changing needs within the field are reviewed. Pr.: Consent of instructor.

EDACE 782. Educational Gerontology. (3) For both the practitioner and those interested in educational gerontology as a field of inquiry. It will examine education for and about aging, with particular reference to the role, needs, and ability of persons in the later years as learners. Pr.: EDACE 780.

EDACE 786. Topics in Adult Education. (1–3) Examination of current topic in area of specialization of faculty Varied topics offered each semester so course may be repeated.

EDACE 790. Characteristics of the Adult Learner. (3) For teachers and administrators in adult and occupational programs who need a familiarity with the major characteristics of adulthood which affect the adult as a learner. Pr.: EDACE 780.

EDACE 791. Career Education. (2–4) On sufficient demand. Emphasis on providing for prevocational and adult experiences including orientation and exploratory and applied experiences in school and nonschool situations. Cross-listed with EDACE/EDSEC 791. Pr.: Teaching experience or consent of instructor.

EDACE 792. Hospital and Industry Adult Education. (3) On sufficient demand. An introduction to principles, roles, organization, procedures, and problems of adult education in hospitals, industry, and related agencies.

EDACE 795. Problems in Adult Education. (Var.) Independent study of specific problems in the areas of adult or occupational education. Pr.: Consent of Instructor.

Graduate credit
EDACE 811. Consumer Education. (3) S. Evaluate syllabi and approaches to teaching consumer education. Relate consumer education to consumer economics and consumer affairs. Cross-listed with EDSEC 811.

EDACE 815. Introduction to Community Educational Development. (3) A comprehensive review of factors related to community change and the role of educational programs in dealing with them. Emphasis is on educational and economic problem-solving approaches and change-implementing programs.

EDACE 820. Advanced Methods in Adult Teaching. (3) On sufficient demand. Emphasis on teaching strategies, techniques, and media appropriate to various adult education programs. Pr.: Teaching experience or consent of instructor. EDACE 780 and 790.

EDACE 825. Theory and Practice of Continuing Education. (3) Specific instruction on facilitating continuing education programs; emphasis on serving the institution, part-time students, community, and other interests. Pr.: EDACE 780 and 790.

EDACE 830. Program Planning in Adult Education. (3) An examination of the basic situations in which adult education occurs and fundamental steps by which learning is made more effective in those situations. Pr.: EDACE 790.

EDACE 860. Nontraditional Study for Adults. (3) Designed to provide a conceptual understanding of current forms of nontraditional study and accreditation with emphasis on organizing studies to serve adult needs. Pr.: EDACE 780.

EDACE 886. Seminars in Adult Education. (Var.) On sufficient demand. These seminars will consider research and professional development on the special interests of the students in the several fields of education represented. Pr.: Consent of instructor.

EDACE 898. Master's Report. (Var.) Pr.: Consent of instructor.

EDACE 899. Master's Research. (Var.) Pr.: Consent of instructor.

EDACE 914. Technical Education. (3) An analysis of the evolving role of technical education and other post-secondary occupational education with emphasis upon principles underlying organization and practice unique to technical education. Cross-listed with EDACE/ EDSEC 914.

EDACE 916. Foundations of Adult Education. (3) On sufficient demand. A study of adult education historical perspectives, contemporary institutions and programs, teaching-learning process, administrative practices, and conceptual roles. Pr.: Consent of instructor.

EDACE 937. Organization and Administration of Adult Education. (3) A critical study of organizational procedures and administrative practices as related to the implementation and maintenance of an effective program in adult education.

EDACE 986. Advanced Seminars in Adult Education. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDACE 991. Internship in Adult Education. (Var.) On sufficient demand. Field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty member. A maximum of 6 credit hours. Pr.: Consent of instructor.

EDACE 999. Doctoral Research. (Var.) Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. Pr.: Consent of Instructor.

For more information
For additional information and application materials please contact:
Office of Graduate Studies
College of Education
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu

Agricultural Communications

Head
Robert Furbee

Graduate faculty
Kristina Boone, Ph.D., Ohio State University.

The department offers no graduate degree.

The following courses may be taken for graduate credit in a minor field.

Agricultural communications courses

Undergraduate and graduate credit in minor field.

AGCOM 550. Internship in Agricultural Communications. (1–3) I, II, S. The intern works in a professional capacity in areas such as print journalism, electronic media, advertising, photography, and public relations. Student is supervised by a professional and a faculty member. One hour of credit for each four weeks of supervised work. Internship report and presentation required. Pr.: Junior standing and departmental approval.

AGCOM 770. Practicum in Professional Journalism. (1–4) I, II, S. Supervised practical work in the area of professional journalism and mass communications. Includes laboratory investigation, field work, and internships. Pr.: MC 500 or MC 320 and consent of supervising instructor.

For more information

Home page: http://www.oznet.ksu.edu/xcom

Agricultural Economics

Head
Daniel J. Bernardo

Director of graduate studies
Allen M. Featherstone

Graduate faculty
Andrew Barkley, University of Chicago.
G. A. Barnaby (Art), Texas A&M University.
David Barton, Purdue University.
Daniel J. Bernardo, Washington State University.
Arlo W. Biere, University of California, Berkeley.
Michael Boland, Purdue University.
Robert O. Burton, Jr., Purdue University.
David L. Darling, The Ohio State University.
Allen M. Featherstone, Purdue University.
Barry Flinchbaugh, Purdue University.
John (Sean) Fox, Iowa State University.
Thomas A. Garrett, West Virginia University.
Orlen Grunewald, University of Kentucky.
Stephen Hamilton, University of California–Berkeley.
Elena I. Ianchovichina, Purdue University.
Marc A. Johnson, Michigan State University.
Rodney Jones, Virginia Polytechnic Institute and State University.
Terry Kastens, Kansas State University.
Michael Langemeier, Purdue University.
John (Zach) Lea, University of Florida.
John Leatherman, University of Wisconsin–Madison.
Thomas L. Marsh, Washington State University.
Roger McEowen, Drake University.
James Mintert, University of Missouri–Columbia.
David W. Norman, Oregon State University.
Ted Schroeder, Iowa State University.
Bryan W. Schurle, Ohio State University.
Kyle W. Stiegert, Purdue University.
William Tierney, Michigan State University.
Jeffery Williams, Michigan State University.
Ping Zhang, Texas Tech University.

Program description

The Department of Agricultural Economics offers studies leading to a master of science (M.S.), master in agribusiness (M.A.B.), or doctor of philosophy (Ph.D.) degree. The Ph.D. degree is joint with the Department of Economics. The M.S. and Ph.D. programs stress a strong foundation in economic theory and quantitative analysis, and their application in agricultural and rural issues. The M.A.B. program emphasizes the application of economic and management concepts to problems facing the agribusiness professional. The agricultural economics program seeks to achieve excellence in teaching, research, and extension through the development of the individual student. The core curriculum is deliberately broad in order to build a framework of fundamental information so that new findings and concepts can be assimilated as they arise in the rapidly changing field of agricultural economics. In addition, the programs are designed to provide graduate students a core body of common knowledge through a number of required courses and limited electives.

Both the master of science and Ph.D. degrees stress a strong foundation in economic theory and quantitative analysis, and their application in agricultural and rural issues. The core curriculum requires of every student successful completion of courses in microeconomic theory, macroeconomic theory, quantitative methods, production economics, and agricultural marketing.

The master in agribusiness program is designed for off-campus students who wish to continue full-time employment while pursuing the post-baccalaureate degree. The M.A.B. program is designed to emphasize the study of economic and agribusiness management concepts and their application to food and agricultural business situations. The curriculum focuses on current issues facing agribusiness managers while providing tools for making better decisions in the areas of risk management, logistics, financial management, strategic planning, agricultural resource, and trade policy, marketing, human resource management, and institutional changes within agriculture.

Admission

M.S. and Ph.D. degrees

Most incoming students have degrees in agricultural economics, economics, business, or some other field in agriculturc. Some students have degrees in other social sciences, statistics, computer science, or engineering. Thc most important consideration for applicants is an interest in continued study and intensive research in some area of agricultural economics with the minimum prerequisites for admission to the program. A strong background in economics and quantitative methods and a sufficient understanding of agriculture are the most important requirements.

Application for admission to the program in a fall semester should be made in the preceding winter or early spring.

Admission to graduate study in agricultural economics requires a minimum grade point average of 3.0 (B average) in the last two years of undergraduate work that earned a bachelors degree. Undergraduate subject matter requirements are as follows:

a. Two courses in the principles of economics

b. A course in intermediate microeconomics or production economics and agricultural market structures

c. A course in intermediate macroeconomic theory

d. An additional course in agricultural economics or economics

e. A course in statistics

f. A course in calculus

Master in agribusiness

Students enrolling in the master of agribusiness program must have at least two years of post-baccalaureate professional work experience in agribusiness or other organizations in the food and agricultural sector. Students admitted to the master of agribusiness program must meet thc following subject matter requirements:

a. One course in principles of macroeconomics

b. One course in introduction to agricultural economics or principles of microeconomics

c. Proficiency in microcomputer operations

d. One course in college algebra

e. One course in accounting

f. One course in statistics

Students whose undergraduate academic performance and program of study warrant admission, although some of the subject matter requirements are not met, may be admitted provisionally. Students admitted provisionally will make up these deficiencies by enrolling in appropriate courses for undergraduate credit. Applicants with grades in the final two years of an undergraduate program that average below 3.0 may, in exceptional cases, be considered for probational admission. Applicants admitted on a probational basis must acquire regular standing by doing satisfactory graduate work during the first semester of graduate study.

Master of science degree requirements

The requirements for a M.S. degree in agricultural economics may be completed in two ways: (1) Complete a minimum of 30 semester credit hours including preparation of a thesis for which 6 credit hours are awarded. (2) Complete a minimum of 36 semester credit hours.

Thesis option

The thesis option will include a minimum of 30 semester hours of graduate credit includ-

ing the master's thesis for which 6 semester credit hours are given. The course requirements are:

		Credit hours
Economic theory		6
ECON 720	Microeconomics Theory	
	and	
ECON 805	Income and Employment Theory	
	or	
ECON 823	Advanced International Economics	
	or	
AGEC 810	Price and Income Policies for Agriculture	
	or	
AGEC 840	International Markets and International Trade	
Agricultural economic theory		6
AGEC 805	Agricultural Marketing	
AGEC 823	Production Economics II	
Quantitative methods		6
STAT 706	Basic Elements of Statistical Theory	
	and	
ECON 830	Econometrics I	
Electives		
AGEC elective		3
General elective		3
Thesis hours		6
AGEC 899	Thesis	
Total credit hours		30

No-thesis option

The no-thesis option will include a minimum of 36 semester hours of coursework and a final examination. The course requirements are:

		Credit hours
Economic theory		6
ECON 720	Microeconomics Theory	
	and	
ECON 805	Income and Employment Theory	
	or	
ECON 823	Advanced International Economics	
	or	
AGEC 810	Price and Income Policies for Agriculture	
	or	
AGEC 840	International Markets and International Trade	
Agricultural economic theory		6
AGEC 805	Agricultural Marketing	
AGEC 823	Production Economics II	
Quantitative methods		9
STAT 706	Basic Elements of Statistical Theory	
AGEC 712	Linear Programming Applications in Agricultural Economics	
ECON 830	Econometrics I	
Agricultural economics electives		9
***Agricultural economics or business electives**		6

***Note:** 3 hours of agricultural economics and 6 hours of the agricutural economics or business electives may be substituted for by a specialty consisting of 9 hours at the 700 level or above.

Total credit hours 36

The 30-credit-hour program with thesis is structured to prepare students for careers in research, analysis, or to continue towards a Ph.D. program. The 36 credit hour program has fewer formal requirements but allows more flexibility to plan and prepare students for careers in public service, commerce, and industry. The candidate is required to take a final oral examination covering the thesis and the subject matter in the major field and the minor field when a minor is selected.

Master in agribusiness degree requirements

The master in agribusiness degree requires the completion of 33 credit hours. The curriculum consists of a set of integrated management and economics topics, including 18 hours of agribusiness courses, 9 hours of business courses, and 6 hours of thesis. Students enter the program as a cohort and pace through the program together over a 30 month period. Course requirements for the master in agribusiness are:

		Credit hours
Agribusiness courses		18
AGEC 700	Applied Agribusiness Economics	
AGEC 701	Computer Decision Tools for Agribusiness	
AGEC 713	Agribusiness Financial Management	
AGEC 720	Agribusiness Risk Management	
AGEC 730	Applied Agribusiness Logistics	
AGEC 760	Quantitative Methods for Agribusiness Professionals	
AGEC 770	International Agribusiness and Policy Analysis	
AGEC 890	Advanced Food and Agribusiness Management	
Business courses		9
MKTG 890	Marketing Management (3 cr.)	
MANGT 820	Human Resources Management or Organizational Behavior (3 cr.)	
	Business Elective (3 cr.)	
Thesis hours		6
AGEC 899	Master's Thesis (6 cr.)	
Total credit hours		36

The thesis involves the application of concepts and quantitative tools learned in course work to a firm-level agribusiness problem. The candidate is expected to take a final oral examination for the purpose of defending the thesis.

Ph.D. degree requirements

The Ph.D. program is offered in cooperation with the Department of Economics. A Ph.D. program of study must have at least 60 credit hours of graduate course work (the credit received for writing an M.S. thesis or report may be used to help meet the 60 credit hour requirements), and 30 hours of research credits are required for the Ph.D. dissertation. A minimum of 24 credit hours of course work on the program of study must be taken at Kansas State University.

The program of study in agricultural economics shall include course work in four branches: economic theory and its history, research methodology, general agricultural economics, and a specialty branch in agricultural economics. The student may choose to list a minor field in addition.

		Credit hours
Economics theory		
ECON 940	Advanced Microeconomic Theory I	3
ECON 945	Advanced Microeconomic Theory II	3
ECON 805	Income and Employment Theory I	3
ECON 905	Income and Employment Theory II	3
ECON 735	Mathematical Econometrics	3
Other courses related to economics theory: ECON 801, ECON 810, ECON 823, ECON 832, ECON 860, ECON 890, ECON 9115, ECON 920, ECON 925, ECON 927, or ECON 955		3
		18
Research methodology		
STAT 706	Basic Elements of Statistical Theory	3
AGEC 712	Linear Programming and Applications in Agricultural Economics	3
ECON 830	Econometrics 1	3
ECON 930	Econometrics II	3
AGEC 901	Research Methods in Economics	3
		15
Required agricultural economics courses		
ECON 823	Production Economics II	3
AGEC 805	Agricultural Marketing	3
AGEC 905	Agricultural Demand and Price Analysis	3
AGEC 923	Economics of Agricultural Production	3
		12
Agricultural economics electives		
AGEC course work at the 700 level or above		3
		9
General electives		
Course work at the 700 level or above		3
		6
Total course credit hours required for the Ph.D. program		60
Dissertation credit hours		30
Total credit hours required for Ph.D. programs		90

Requirements for the specialty branches

Production economics/farm management

AGEC 812	Advanced Farm Economics
AGEC 823	Production Economics II
AGEC 923	Economics of Agricultural Production

Marketing/price analysis

AGEC 805	Agricultural Marketing
AGEC 840	International Markets and Agricultural Trade
AGEC 905	Agricultural Demand and Price Analysis

Agricultural and resource policy

AGEC 810	Price and Income Policies for Agriculture
AGEC 836	Natural Resource Policy
AGEC 840	International Markets and Agricultural Trade

International agricultural development and trade

AGEC 815	Advanced Agricultural Development
AGEC 840	International Markets and Agricultural Trade

One of the following courses:

AGEC 810	Price and Income Policies for Agriculture
AGEC 836	Natural Resource Policy
ECON 860	Growth and Development Theories
FINAN 820	Advanced International Financial Management
MANGT 892	International Operations Analysis
MKTIB 844	Advanced International Marketing
POLSC 707	Comparative Administrative Systems
GEOG 730	World Agricultural Systems
SOCIO 734	Sociology of Rural Development
SOCIO 740	Comparative Social Systems

After completing 12 hours of microeconomics and macroeconomics, the student takes qualifying examinations in microeconomic and macroeconomic theory. After completing all course work on the program of study, the student takes comprehensive examinations in general agricultural economics and a specialty field. After passing the comprehensive examinations the student is admitted to candidacy. The candidate prepares a written dissertation proposal including an identification of the problem, a review of relevant literature, and an outline of proposed research procedures to be used. The candidate must satisfactorily defend the proposal in a seminar at least six months before the final Ph.D. oral in which the candidate defends the dissertation.

Research facilities

The Department of Agricultural Economics is well equipped for research in agricultural economics. Computing equipment and support staff are available to assist researchers. Interdisciplinary research is encouraged and facilitated.

Graduate programs and research in related departments such as economics, statistics, mathematics, computer science, industrial engineering, business administration and the production departments in agriculture provide support for research and graduate education in agricultural economics.

Financial support

The Department of Agricultural Economics financially supports graduate study and development in numerous ways. Students enrolled in the M.S. and Ph.D. programs are eligible for graduate research, teaching, and extension assistantships. Departmental faculty regularly secure research and extension grants from federal agencies, state agencies, commodity commissions, research foundations, and private industry. In addition, the department routinely supports several teaching and research assistantships. The department has a successful record of securing USDA National Needs Fellowships and other graduate student fellowships and scholarships. Graduate assistantships are usually on a four-tenths basis. Stipends vary depending upon time worked and level of graduate education. Graduate assistants and instructors are regarded as residents for enrollment fee purposes.

Agricultural economics courses

Undergraduate and graduate credit in minor field

AGEC 500. Production Economics. (3) I, II. Application of economic principles to problems of agricultural production. Analysis of consumer demand for agricultural products and input and output decisions of the agricultural firm. AGEC 505 is a continuation of this course and they are intended to be taken in consecutive semesters. Three hours rec. a week. Pr.: AGEC 120 or ECON 120 and MATH 205.

AGEC 505. Agricultural Market Structures. (3) I, II. Theory and application of economic principles to marketing problems in agriculture. Pricing of agricultural output and productive services under various forms of economic organization and competition; regional specialization, location, and trade; determinants of economic change; evaluation of economic and consumer welfare. Three hours rec. a week. Pr.: ECON 110 and AGEC 500.

AGEC 513. Agricultural Finance. (3) I, II. Analysis of capital investments, interpretation of financial statements, capital structure considerations for agricultural firms, and farm real estate pricing. Three hours rec. a week. Pr.: AGEC 308 or AGEC 318 and ACCTG 231.

AGEC 515. Food and Agribusiness Marketing. (3) I, II. A broad view of marketing; food markets and consumption; marketing functions and institutions; prices, competition, and marketing costs; functional and organizational issues; food marketing regulations; commodity marketing. Three hours rec. a week. Pr.: AGEC 120 or ECON 120.

AGEC 520. Market Fundamentals and Futures/ Options Trading. (3) I. This is an experiential course in the trading of commodity futures and options. Attention is focused on the study of market price determination, the implications of market efficiency notions, and on actual trading of futures and options. Students invest in a commodity educational trading fund. Class approves recommendations by vote, orders are placed with a broker, and the class monitors open trades. The pool balance at the end of the semester is redistributed to students. Pr.: AGEC 420.

AGEC 525. Natural Resource Economics. (3) I. Emphasis on the application of demand, supply, and price concepts in the study of natural resource use, policies, and management. Interdependence between environmental quality and economic actions are examined through discussion of property rights, economic incentives, externalities, and economic components of environmental policies. Pr.: ECON 120 or AGEC 120 and junior standing.

AGEC 541. Agricultural Economics and Agribusiness Seminar. (Var.). Seminars of special interest will be offered upon sufficient demand in selected areas relating to agricultural economics and agribusiness.

AGEC 590. Agricultural Economics and Agribusiness Honors Problems. (2) I, II, S. Problems course for College of Agriculture honors projects.. Pr.: College of Agriculture honors program participant and consent of honors project advisor.

AGEC 598. Farm Management Strategies. (3) I. A study of management concepts, tools, and decision strategies applied to farm firms. Alternative measures of farm business performances, as well as planning and evaluation techniques for an uncertain environment, are examined. Pr.: AGEC 308, AGEC 500 and AGEC 513.

AGEC 599. Food and Agribusiness Management Strategies. (3) II. This course integrates the risk, production, marketing, and financial management strategies of agribusiness firms. Special attention is given to the application of economic theory and quantitative analysis to business decision-making processes. In addition to case studies, a variety of analytical techniques will focus on both markets and firms involved in the production and marketing of food commodities. Three hours lec. a week. Pr.: AGEC 318, AGEC 500, AGEC 513 or FINAN 450, AGEC 515.

Graduate credit

AGEC 605. Price Analysis and Forecasting. (3). II. The analysis of selected agricultural prices; application of regression analysis to price analysis, the role of futures markets and market efficiency, optimal hedging strategies, commodity option pricing, and price forecasting. Three hours rec. a week. Pr.: STAT 330 or 351; AGEC 490; AGEC 505 or ECON 520.

AGEC 610. Current Agriculture and Natural Resource Policy Issues. (3) II. Current issues in agricultural and natural resource policy from divergent perspectives. Classroom discussion, debate, writing assignments, and student presentations. Current events are analyzed and synthesized from both economic and noneconomic perspectives. Topics may include environmental issues, international agricultural development, the politics of farm programs, and the relationship between technology, agriculture, and society. Pr.: AGEC 505 and either AGEC 525 or AGEC 410.

AGEC 623. International Agricultural Trade. (3) II. Applied economics of agricultural trade. Emphasis on why trade occurs, current agricultural trade patterns, the effects of agricultural policy on trade, and the institutions of trade. Pr.: AGEC 505.

AGEC 631. Principles of Transportation. (3) II. Examines the transportation market from the shippers' point of view by examining the impact of transportation on business firm decisions such as location, markets, and prices. Also covers the costs, prices, and service characteristics of railroads, motor carriers, water carriers, oil pipelines, and airlines. The role and impact of government in the transportation market is examined from both a promotion and regulation perspective. Pr.: ECON 120 or AGEC 120.

AGEC 632. Agribusiness Logistics. (3) I. Planning for efficient use of transportation, storage and processing facilities in the handling of raw materials and products for agribusiness firms, controlling shipments and inventory in coordination with warehouse and handling operations, and scientific selection of routes, schedules, and equipment. Pr.: ECON 110 and junior standing.

AGEC 641. Agricultural Economics and Agribusiness Seminar. (Var.) Seminars of special interest will be offered upon sufficient demand in selected areas relating to agricultural economics and agribusinesses. Pr.: Junior standing and consent of the instructor.

AGEC 680. Risk Management. (3) II. An introduction to the use of futures, options, derivatives and other financial instruments as tools for risk management. Topics would include arbitrage, asset pricing, cash flow analysis, efficient markets, insurance, leverage, portfolio analysis, risk, and valuation. Tools of risk management will be applied to case and real time agricultural examples. Pr.: AGEC 520, AGEC 513.

AGEC 700. Applied Agribusiness Economics. (3) S. Application of economics principles to problems of agricultural production and agribusinesses. Demand analysis will be used to examine changes in individual and market demand. Cost minimization and profit maximization will be used to examine firm and market decisions. Pr.: MATH 100, ECON 120 or AGEC 120.

AGEC 701. Introduction to Computer Decision Tools for Agribusiness. (1) II. Development of decision tools for agribusiness using spreadsheets. Topics include internet as a data source, budget development and analysis, simulation, regression, search techniques, and optimization. Pr.: CIS 110.

AGEC 712. Linear Programming Applications in Agricultural Economics. (3) II. Application of linear programming and related topics for decision analysis in agricultural firms. Pr.: AGEC 500.

AGEC 713. Agribusiness Financial Management. (2) II. This course covers financial management, long-term investment analysis, and the cost of capital for agribusiness. Topics covered include long-term decision-making, valuation of durable assets, investment utilization strategies, accounting for risks, and liquidity relationships. Applications include agribusiness decision making, valuing research and project analysis. Pr.: ACCTG 231, AGEC 513.

AGEC 720. Agribusiness Risk Management. (2) II. Various forms of risk inherent to firms operating in agricultural and food product markets are explored. The most prevalent sources of risk are investigated along with their likely short- and long-run financial impacts on agribusiness firms. Measures of assessing risks in agribusinesses are identified including price, production, product quality, and firm strategic positioning risk. Focus is on managing risks inherent in global agricultural commodity and food product markets. Pr.: AGEC 420 and AGEC 760.

AGEC 730. Applied Agribusiness Logistics. (2) II. Applied study of agribusiness logistics using case study analysis along with the study of principles and concepts that structure agribusiness decisions concerning logistics and operations configuration. Studies will show the role and scope of logistics in agribusiness, develop the connection between economic developments and logistics, explore the role of transactions costs and the principal-agent problems associated with outsourcing and strategic alliances, explore emerging technologies and tools for logistics planning—such as information technology and ECR, outsourcing, just-in-time inventory systems, total quality management, least cost arrangements and forecasting demand for logistical services. Pr.: AGEC 120 or ECON 120 and AGEC 701.

AGEC 740. Seminar in Agricultural Economics Analysis. (Var.) Seminar on methods of economic analysis will be offered upon sufficient demand. Pr.: Consent of instructor.

AGEC 750. Agricultural Economics and Agribusiness Problems. (Var.) I, II, S. Pr.: Junior standing and consent of the instructor.

AGEC 760. Quantitative Methods for Agribusiness Professionals. (3) I. The development of quantitative and analytical tools and their application to applied agribusiness decision making. Regression techniques will be applied to price analysis/forecasting and estimation of supply and demand functions. Optimization techniques including linear and non-linear programming will be applied to a variety of agribusiness problems such as logistics, cost management, and portfolio evaluation. Pr.: STAT 330 and AGEC 701.

AGEC 770. International Agribusiness and Policy Analysis. (2) II. Policies affecting agribusiness firms will be examined. These topics may include U.S. agricultural policies, fiscal and monetary policies, international trade agreements, environmental issues, and current policies influencing agribusiness firms. Pr.: ECON 110 and AGEC 701.

AGEC 805. Agricultural Marketing. (3) II, S. The study of the demand for supply of agricultural commodities, alternative market structures, the dynamics of marketing institutions that affect market structures, governmental intervention in agricultural markets, futures markets in agriculture, and international agricultural commodities trade. Three hours rec. a week. Pr.: AGEC 505 or ECON 520.

AGEC 810. Price and Income Policies for Agriculture. (3) I. A study of the effects of government price, regulatory, and tax policies on (1) farm income levels and variability, (2) farm productivity and output, (3) economic structure of farming, and (4) performance of agricultural markets. Three hours. rec. a week. Pr.: AGEC 500 or ECON 520, ECON 510.

AGEC 812. Advanced Farm Economics. (3) I. A study of managerial techniques and processes applied to farm firms involved in production and marketing of agricultural products. This study includes managerial planning, evaluation, and control of farm businesses. Three hours rec. a week. Pr.: AGEC 308.

AGEC 815. International Agricultural Development. (3) II. Even years. To study the principles of economic development when applied to the development of the agricultural sector. This includes the examination of national and international strategies and policies that inhibit and/or encourage the development of the agricultural sectors in low income countries. Individual study is encouraged to meet student interest: (a) in understanding the process and including an appreciation of the interdependence between low and high income countries and (b) receiving an introduction to agricultural project analysis. Pr.: AGEC 500 or ECON 520.

AGEC 816. Farming Systems Approach to Sustainable Development. (1) II. To examine the farming systems approach to sustainable development in terms of its evolution, the methodologies currently used in its implementation, and challenges it faces in the future in terms of facilitating a farmer participatory or client oriented/ empowered approach to appropriate technology generation, dissemination and extension, and to sustainable development. One hour lec. a week. Pr.: AGEC 120 or ECON 120.

AGEC 823. Production Economics II. (3) I. Economic theories of choice under conditions of imperfect knowledge (i.e. under risk and uncertainty) and the application of these theories to production decisions. Pr.: AGEC 500 or consent of instructor.

AGEC 831. Agricultural Marketing Management and Analysis. (Var.) I, II, S. Marketing problems of firms that market or process farm products or handle farm supplies, with special emphasis on tools of analysis for solving marketing problems. Supervision if students' internship programs. Pr.: Consent of instructor.

AGEC 836. Natural Resource Policy. (3) I. The economic tolls of welfare analysis, non-market valuation, and dynamics are used to evaluate natural resource use, natural resource policies, and conflicts among users, conservationists, and preservationists. Pr.: AGEC 505 or ECON 520; and MATH 205.

AGEC 840. International Markets and Agricultural Trade. (3) II. Pure and monetary theories of international agricultural trade. International trade policies and trade negotiations are evaluated in detail. Special consideration is given to the international trade policy influences on agriculture. The international agricultural trade arena, imperfect competition, and exchange rate economics are discussed. Institutions are policies of major trading nations are explored. Three hours. rec. a week. Pr.: ECON 720.

AGEC 890. Advanced Food and Agribusiness Management. (3) 1. The objective of the course is to demonstrate how economic concepts underscore strategic management principles. Applications to food and agribusiness firms are used to show how managers and firms function when the assumptions of perfect competition are relaxed. Students will complete a market analysis study as part of the course requirements. Pr.: AGEC 599.

AGEC 898. Agricultural Economics Master's Report. (Var.) I, II, S. Master's report.

AGEC 899. Agricultural Economics Master's Research. (Var.) I, II, S. Research for master's thesis.

AGEC 901. Research Methods in Economics. (3) II. A study of scientific methodology in economic research including the history of various debates regarding methodology in economics. The course also deals with problem definitions, formulation of hypotheses, listing of hypotheses, and presentation of research results. Three hours rec. a week. Pr.: Graduate standing.

AGEC 905. Agricultural Demand and Price Analysis. (3) II. A study of the demand for and supply of farm products, price formation and markets, the causes of price variations and instability, the dynamic analysis of agricultural prices. Three hours rec. a week. Pr.: ECON 930, AGEC 805, ECON 945.

AGEC 922. Seminar in Agricultural Marketing. (Var.) On sufficient demand. Analysis of special problems and current developments faced by firms and agencies associated with the marketing process for agricultural products. Pr.: Consent of instructor.

AGEC 923. Economics of Agricultural Production. (3) I. A study of agricultural production response to prices; methods of estimating supply response and price expectations; the effects of government and institutions on agricultural supply and the role of risk, technical change, and the number and size of farms on agricultural supply. Three hours rec. a week. Pr.: ECON 830, AGEC 823, ECON 945.

AGEC 936. Quantitative Topics in Agricultural Economics. (3) II, in even years. A study of recent developments reported in the literature concerning quantitative methods of analysis in agricultural economics and economics. The study will include assigned projects to apply selected techniques of analysis. Three hours rec a week. Pr.: ECON 930.

AGEC 940. Seminar in Agricultural Economics. (Var.) On sufficient demand. Problems and current developments in agricultural economics. Pr.: Consent of instructor.

AGEC 955. Independent Study of Advanced Topics in Agricultural Economics. (Var.) I, II, S. Advanced independent study of an agricultural economics topic based upon a student proposal approved by the student's supervisory committee. Pr.: Completion of 24 credits of graduate study.

AGEC 999. Agricultural Economics Ph.D. Research. (Var.) I, II, S. Research for Ph.D. dissertation.

For more information

For additional information and application materials please contact:
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Agricultural Technology Management

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John W. Slocombe, Ph.D., Iowa State University.
Charles K. Spillman, Ph.D., Purdue University.
James M. Steichen, Ph.D., Oklahoma State University.
Naiqian Zhang, Ph.D., Virginia Polytechnic Institute and State University

A graduate degree is not offered in agricultural technology and management.

The following courses may be taken for graduate credit in a minor field.

Agricultural technology management courses

Undergraduate and graduate credit in minor field.

ATM 511. Agricultural Building Systems. (3) II. Concepts and fundamentals related to agricultural building systems including structural materials, beam and column strength, environmental control for plants and animals, farmstead layouts, crop storage, livestock and plant production facilities, and waste management. Three hours rec. a week. Pr.: ATM 160 or PHYS 113 or 115.

ATM 515. Problems in Agricultural Technology Management. (Var.) I, II, S. Problems in the application of technical principles to agricultural technology management Pr.: Approval of instructor.

ATM 520. Food Manufacturing Laboratory. (2) I. Food manufacturing processes, quality and safety from raw materials to final packaged product. Three hours lab a week. Pr.: MATH 100 and ASI 305.

ATM 540. Introduction to Food Engineering. (3) I. Material and energy balances with application to food processing. Fluid flow and heat transfer in food processing. Thermodynamic properties and laws. Conc. enrollment in ATM 541 is urged. Three hours rec. a week. Pr.: PHYS 113 or 115, BIOCH 120 or CHM 190, MATH 210 or 205.

ATM 541. Introduction to Food Engineering Laboratory Exercises. (1) I. Laboratory experiments supplementing ATM 540. Three hours lab a week. Pr. or conc.: ATM 540.

ATM 558. Soil Erosion and Sediment Pollution Control. (3) II. Planning and analysis of production systems with respect to regulatory, environmental, and resource management. Water and wind erosion; estimating soil loss; estimating runoff rate and volume; laying out and checking terraces, waterways and farm ponds; agricultural surveying; and conservation planning. Two hours rec. and three hours lab a week. Pr.: AGRON 305.

ATM 571. Functional Components of Machines. (3) II. Machine components used to transmit power and perform functional operations in biological systems. Emphasis on fluid and mechanical drive systems. Three hours rec. a week. Pr.: ATM 360.

ATM 651. Grain and Forage Handling Systems. (3) I. Principles of grain and forage conditioning and storage. Structures and equipment for quality preservation. Two hours rec. and three hours lab a week. Pr.: ATM 160 or PHYS 113 or 115 and senior standing.

ATM 653. Water Management and Irrigation Systems. (3) I. Management of water in crop production systems, crop water use, and irrigation scheduling. Fundamentals of water flow in pipe networks, pumping plants, and irrigation systems. Two hours rec. and three hours lab a week. Pr.: AGRON 305.

ATM 661. Water and Waste in the Environment. (3). II. Principles and practices surrounding: water sources and quality; wastewater microbiology; animal, food processing plant, and domestic waste handling, treatment, and utilization; surface and groundwater contamination, protection, and treatment. Three hours rec. a week. Pr.: CHM 110 or 210 and BIOL 198.

ATM 703. Topics in Agricultural Technology Management. (Var.) On sufficient demand. A course reserved for the study of current topics in agricultural systems and technology. Topics announced when offered. May be repeated to a maximum of 9 credit hours. Pr.: Six credit hours of ATM courses.

Department of Biological and Agricultural Engineering Home page:
http://www.bae.ksu.edu/

Agriculture, General

Associate dean
Larry Erpelding

A graduate degree is not offered in general agriculture.

The following courses may be taken for graduate credit in a minor field.

General agriculture courses

Undergraduate and graduate credit in minor field.

GENAG 500. Food Science Seminar. (1) I. Review of recent developments in the food science industry and in food science research. Food science literature and intradepartmental research will provide source material. Required of all food science undergraduates in agriculture.

GENAG 505. Comparative Agriculture. (1–4) Intersession. A travel-study program which is intended to acquaint students with agriculture of other countries and other parts of the U.S. and how it differs from Midwest-Great Plains agriculture relative to climate, crops, soils, livestock practices, marketing, and cultural attitudes toward agriculture. Pr.: Consent of instructor.

GENAG 515. Honors Presentation. (1) I, II, S. Presentation of completed teaching or extension activity, research project, or demonstration project. Pr.: Successfully completed honors proposal and permission of honors advisor.

GENAG 582. Natural Resources/Environmental Science Project (NRES). (3) I, II. A comprehensive project in NRES. Requires integration of information and understanding acquired in NRES secondary major courses. Students must prepare and present written and oral reports. Three hours rec. a week. Pr.: All writing and oral communications courses required for major. Pr. or conc.: 15 hours of approved courses in NRES secondary major. Cross-listed with DAS 582 and DEN 582.

GENAG 630. Food Science Problems. (1–3) I, II, S. Research or related work with others, or a literature search. Written reports are required. Any field of food science for which the student has adequate background. Pr.: ASI 302 and junior standing.

GENAG 780. Current Topics in Agriculture. (1–3) On sufficient demand. Selected topics studied to provide an in-depth understanding of current agricultural issues. May be repeated with change in topics. Pr.: Completion of baccalaureate degree.

For more information

Home page: http://www.oznet.ksu.edu/coa/

Agronomy

Head
David Mengel

Director of graduate studies
Richard Vanderlip

Graduate faculty

Kassim Al-Khatib, Ph.D., Kansas State University.
D. V. Armbrust, (Adjunct) Ph.D., Kansas State University.
Gina Brown-Guedira, (Adjunct) Ph.D., Kansas State University.
D. D. Buchholz, Ph.D., Kansas State University.
P. I. Coyne, Ph.D., Utah State University.
Randall Currie, Ph.D., Texas A&M.
Dan Devlin, Ph.D., Washington State University.
S. W. Ehler, Ph.D., University of Missouri.
W. H. Fick, Ph.D., Texas Tech University.
Dale Fjell, Ph.D., Kansas State University.
J. O. Fritz, Ph.D., University of Illinois.
W. B. Gordon, Ph.D., South Dakota State University.
L. J. Hagen, (Adjunct) Ph.D., Kansas State University.
J. M. Ham, Ph.D., Texas A&M University.
W. L. Hargrove, Ph.D., University of Kentucky.
M. J. Horak, Ph.D., University of Illinois.
Rhonda Janke, Ph.D., Cornell University.
M. B. Kirkham, Ph.D., University of Wisconsin.
G. J. Kluitenberg, Ph.D., Iowa State University.
K. D. Kofoid, Ph.D., University of Nebraska.
R. E. Lamond, Ph.D., Kansas State University.
G. H. Liang, Ph.D., University of Wisconsin.
L. D. Maddux, Ph.D., University of Nebraska.
T. J. Martin, Ph.D., Michigan State University.
V. L. Martin, Ph.D., Ohio State University.
D. B. Mengel, Ph.D., Purdue University.
C. E. Owensby, Ph.D., Kansas State University.
G. M. Paulsen, Ph.D., University of Wisconsin.
D. E. Peterson, Ph.D., North Dakota State University.
G. M. Pierzynski, Ph.D., The Ohio State University.
G. L. Posler, Ph.D., Iowa State University.
M. D. Ransom, Ph.D., The Ohio State University.
D. L. Regehr, Ph.D., University of Illinois.
C. W. Rice, Ph.D., University of Kentucky.
Paul St. Amand, Ph.D., North Carolina State University.
W. T. Schapaugh, Jr., Ph.D., Purdue University.
A. J. Schlegel, Ph.D., Purdue University.
John P. Schmidt, Ph.D., North Carolina State University.
R. G. Sears, Ph.D., Oregon State University.
J. P. Shroyer, Ph.D., Iowa State University.
E. L. Skidmore, (Adjunct) Ph.D., Oklahoma State University.
D. Z. Skinner, (Adjunct) Ph.D., Kansas State University.
P. W. Stahlman, Ph.D., University of Wyoming.
L. R. Stone, Ph.D., South Dakota State University.
D. W. Sweeny, Ph.D., University of Florida.
S. J. Thien, Ph.D., Purdue University.
Mitchell R. Tuinstra, Ph.D., Purdue University.
R. L. Vanderlip, Ph.D., Iowa State University.
S. M. Welch, Ph.D., Michigan State University.
D. A. Whitney, Ph.D., Iowa State University.
Merle Witt, Ph.D., University of Nebraska.
Kang Xia, Ph.D., University of Wisconsin–Madison.

Program objectives

The Department of Agronomy offers courses of study leading to degrees of master of science and doctor of philosophy in many diverse crop, soil, and range science specializations. These study areas include: agricultural climatology, crop-climate modeling, crop ecology, crop physiology, crop production, cytogenetics, environmental chemistry, environmental physics, forage management, plant breeding, plant genetics, range science, soil biochemistry, soil fertility, soil genesis and classification, soil microbiology, soil-plant-water relations, soil physics/biophysics, soil/water chemistry, soil/water conservation, soil/water management, and weed science.

The department consists of 54 graduate faculty members, about 65 graduate students, and several postdoctoral fellows and visiting scientists. The faculty are dedicated to providing students individualized training needed to address the many challenges facing agriculture.

Graduate programs are designed to accommodate the interest and objectives of the student. These programs require students to conduct original research. Students receive thorough training in investigative techniques by using modern facilities and through experienced guidance by faculty. Critical parts of the process involve the preparation of research findings in the form of a thesis or dissertation and their publication in a scientific journal. Students are encouraged to develop independent thought as well as a broad spectrum of knowledge. Flexibility in graduate training is possible because of the large number of faculty and the diversity of their research interests.

Facilities and equipment

The Department of Agronomy laboratories are well equipped with modern instrumentation for research in the many areas of specialization. Controlled environment chambers and greenhouses are available. Excellent dryland and irrigated field research facilities are available at the agronomy farms near Manhattan, at eight agronomy experiment fields, and at four Agricultural Research Centers located throughout the state. A large inventory of field, plot, and laboratory equipment enables graduate students to plan and implement complex research programs which address challenges facing agriculture. Vehicle support provides student access to the diverse cropping and grazing systems present in Kansas. The Rannells Range Research Unit and the Konza Prairie enable native range investigations to be conducted at Manhattan. Special facilities which can be utilized by graduate students include the USDA Wind Erosion

Lab, USDA Grain Marketing Lab, Agronomy Soil Testing Lab, and other service labs. Reference materials from the university library are complemented by the agronomy graduate library, housed within the department. Graduate students benefit from excellent computer and networking facilities through the mainframe computer center. State-of-the-art personal computers are available for use by all students.

Admission

Incoming students commonly have a bachelor or master of science degree in agriculture, agronomy, crop science, soil science, or a related physical or life science. The most important considerations for applicants are an interest in continued study and intensive research in a specific area of agronomy along with prerequisites for admission to the program. Preparation in the biological, physical, and mathematical sciences is considered fundamental for all areas of graduate study in agronomy. Course requirements for each student are determined by a supervisory committee with consideration given to the student's qualifications and professional interests and goals.

Stipends

Research and teaching assistantships and research fellowships are available to graduate students in the Department of Agronomy. A majority of the students enrolled in agronomy are supported during their graduate study. Nearly 50 percent of graduate students are appointed to a half-time graduate research assistantship. Stipends are competitive with leading universities. Graduate teaching and research assistants are assessed the in-state rate for tuition and fees. Graduate teaching assistants receive a substantial reduction of in-state tuition. An excellent graduate scholarship program provides additional assistance to several graduate students each year.

Application procedure

Applications are accepted at any time. However, students desiring admission and consideration for an assistantship for the fall semester are urged to submit their applications early, preferably before February 1, to enhance their chances for admission and financial support. The completed application form, statement of objectives, transcripts, and letters of recommendation are used to determine qualifications for graduate work. GRE scores are not required.

Agronomy courses

AGRON 501. Range Management. (3) I. Fundamental ecological principles of production, conservation, and use of grasslands. Application of these fundamental principles to management. Three hours rec. a week.

AGRON 505. Biotechnology. (2). II. The use of biotechnology and molecular genetic approaches in plant and animal sciences. Emphasis is on the use of molecular techniques for plant and animal improvement. Two hours lectures per week. Pr.: BIOL 198. Cross-referenced as PLPTH 505.

AGRON 515. Soil Genesis and Classification. (3) II. Study of the factors and processes of soil formation, classification of soils according to soil taxonomy, and use of soil survey information. Required field trips. Two hours rec. and three hours lab a week. Pr.: GEOL 100 and AGRON 305 or consent of instructor.

AGRON 520. Grain Production. (3) II. An upper-level course for those interested in grain production in the Central Plains. Pest control, limiting factors, and planting factors will be considered in view of climatic conditions and crop plant growth habit. From this, a crop production strategy will be developed for each crop. Pr.: AGRON 220 and 375.

AGRON 550. Forage Management and Utilization. (3) II. Production and utilization of forage crops. Development of forage programs for livestock production, including pasture and stored forages. Three hours rec. a week. Pr.: AGRON 220 and junior standing.

AGRON 551. Forage Management and Utilization Laboratory. (1) II. Identification of forage species, techniques for estimating forage quality, forage physiology, and field trips. One two-hour lab a week. Pr.: Completion of or conc. enrollment in AGRON 550.

AGRON 560. Field Identification of Range and Pasture Plants. (1) I, in odd years. Identification of range pasture plants through exposure to them in their natural environment. Pr.: AGRON 220 or BIOL 210 or consent of instructor.

AGRON 599. Agronomy—The Profession. (1). II. An overview of opportunities, responsibilities, and challenges for the professional agronomist. Discussion of current topics and important issues in crops and soils, range management, and soil and water resources.

AGRON 600. Crop Problems. (Var.) I, II, S. Studies may be chosen in: genetics, crop improvement, forages, ecology, weed control, plant physiology, or crop production.

AGRON 605. Soil and Environmental Chemistry. (3) I. A study of inorganic and organic chemistry of soils with a detailed examination of the solid, liquid, and gaseous phases. Includes discussions of mineral solubility, electrochemical and adsorption phenomena, acidity, salinity, and fertility. Emphasis is placed on the biogeochemical cycling of plant nutrients and important soil contaminants. Three hours of recitation a week. Pr.: AGRON 375 or 305 and CHM 230.

AGRON 615. Soil Problems. (Var.) I, II, S. Studies may be chosen in: chemistry, physics, conservation, fertility, genesis, morphology, or classification.

AGRON 630. Principles of Crop Improvement. (3) II. Basic plant breeding techniques used to genetically improve crops. Procedures to increase, distribute, and maintain breeding stocks and varieties. Two lec. and one two-hour lab a week. Pr.: AGRON 220 and ASI 500.

AGRON 635. Soil Conservation and Management. (3) I. Principles, mechanics, and prediction of water and wind erosion. Influence of soil erosion on soil productivity and environmental quality. Conservation management technologies for erosion control and sustaining soil productivity. Legislation and land-use planning for soil conservation. Course requires microcomputer skills. Two hours rec. and 1 three-hour lab a week. Pr.: AGRON 305.

AGRON 645. Soil Microbiology. (4) I. The nature and function of soil microorganisms in the soil ecosystem. The role of soil microbial activity to soil organic matter, mineral transformations, plant nutrition, and environmental quality. Three hours rec. and two hours lab a week. Pr.: AGRON 305 or BIOL 455.

AGRON 655. Site Specific Agriculture. (3) II. Introduction to spatial analysis and management of agricultural and environmental resources using geographic information systems (GIS) technology. Emphasis on collecting, displaying, and analyzing spatial or georeferenced soil, crop, or other land surface data. Two hours lecture, two hours lab, and one hour by appointment per week. Pr.: AGRON 220 and 305 and GEOG 508.

AGRON 660. Range Research Techniques. (3) I, in even years. Discussion of quantitative and qualitative procedures used to study vegetation. Includes application, advantages, and disadvantages of these methods. Use of statistical techniques for sampling, analysis, and presentation of data. Two hours rec. and one three-hour lab a week. Pr.:AGRON 501 and STAT 320.

AGRON 670. Range Management Problems. (Var.) I, II. S.

AGRON 681. Range Ecology. (3) II, in even years. Application of ecological principles to range ecosystem management. Study of plant-soil-animal interactions with rangelands, and discussion of plant succession, environmental influences, and ecological concepts. Two hours rec. a week and one lab credit consisting of field trips to representative range areas. Pr.: AGRON 501 and BIOL 529.

AGRON 716. Herbicide Interactions. (3) II, in even years. A study of systems and physiological processes in plants and soils as they affect herbicide fate and activity and are affected by herbicides. Research methodology and literature will also be discussed and evaluated. Pr.: AGRON 330 and BIOL 500 or equiv.

AGRON 720. Advanced Weed Ecology. (3) II, in odd years. A study of advanced weed ecology topics including weed/crop interference, weed growth and development, herbicide resistance, biological control, and ecological approaches to weed management. Three lectures per week. Pr.: AGRON 330.

AGRON 746. Physical Properties of Soils. (3) II. The properties of soils as affected by their physical environment, including water content, water potential, temperature, aeration, flocculation-dispersion, and soil compaction. Three hours of recitation a week. Pr.: AGRON 305.

AGRON 762. Range Grasses. (2) I, in even years. Field and laboratory study of range and pasture plants, with special emphasis on grasses and their distinguishing characteristics. One hour rec. and two hours lab a week. Pr.: BIOL 198 or 210.

AGRON 770. Plant Genetics. (3) I. Concepts and application of basic genetic principles in higher plants. Probability, linkage, chromosome aberrations, aneuploidy analysis, gene transfer in wide crosses, tissue culture and crop improvement, and genetics of disease resistance. Three hours rec. a week. Pr.: ASI 500.

AGRON 780. Orientation to Field Crop Breeding. (1) U, in odd years. A field-oriented course emphasizing the practical aspects of plant breeding and overviews of operating procedures for the improvement of agronomic/horticulture crops. This course will provide insight into the operations, funding, and organization of the plant breeding programs at Kansas State University and commerical plant breeding companies. Field tours of public and commercial plant breeding programs will be included. Pr.: ASI 500.

AGRON 790. Range Management Planning. (3) II, in odd years. Inventory and analysis of rangeland resources and development of detailed management plan. Emphasizes range management principles and practices useful in maximizing production from rangelands. Two hours rec. a week and one lab credit including field trips to ranch operations. Pr.: AGRON 501.

AGRON 807. Applied Geostatistics. (2) Spring Intersession, odd years. Analysis of spatially-correlated data. Univariate, bivariate, and spatial description; global and point estimation; random function models; stationarity; intrinsic hypothesis; semivariogram; correlogram; ordinary and block kriging; cross validation; cross correlation and cokriging; experimental design. One hour lec. and one hour computer lab a day. Pr.: STAT 510 or STAT 703. Cross-listed with CE 807, STAT 807.

AGRON 810. Agronomy Seminar. (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing.

AGRON 816. Soil Physics. (3) II, in even years. A study of the transport of water, heat, gases, and solutes in soil. Examples are presented that related to both agricultural and engineering land uses. Emphasis is given to understanding how soil physical properties and soil management practices influence transport processes. Three hours rec. a week. Pr.: AGRON 746 and MATH 220.

AGRON 820. Plant Water Relations. (3) II. Properties of water, terminology in plant and soil water relations, environmental aspects of plant-water relations, soils as a water reservoir, water as a plant component, water movement through the plant, special aspects of transpiration, development and significance of internal water deficits, drought resistance mechanisms, water consumption by crop plants. Pr.: AGRON 220 and 305, BIOL 500.

AGRON 825. Soil and Plant Analysis. (3) I, in odd years. Theories and procedures for the chemical analysis of soils and plant materials. Applications of analysis in soil fertility evaluations and in research work are discussed. One hour rec. and six hours lab a week. Pr.: AGRON 305, CHM 271.

AGRON 830. Quantitative Genetics in Relation to Plant Breeding. (3) I, in odd years. Application of statistical principles to biological populations in relation to gene and zygotic frequencies, mating systems, and effects of mutation, migration, and selection on equilibrium populations; partitioning of genetic variance, concept and methods of estimating heritability, theoretical basis of heterosis, diallel cross and combining ability, genotype by environment interaction, genetic advance under selection, models on phenotypic expression of various crops; genetics of autopolypoids. Pr.: AGRON 770; STAT 730, 704, and 705 or equiv.

AGRON 835. Nutrient Sources, Uptake and Cycling. (3) II, in odd years. An examination of the behavior of plant nutrients in souls emphasizing nutrient sources, the interaction of nutrient with soils, and the role of plant root as nutrient sinks. Includes processes used in the formulation of chemical fertilizers and the assessment of available nutrients in non-commercial plant nutrient sources. Three hours res. a week. Pr. AGRON 375.

AGRON 840. Crop Physiology. (3) II, in odd years. Principles of nitrogen metabolism, mineral nutrition, photosynthesis, growth substances, and hardiness applied to crop production. Three hours rec. a week. Pr.: BIOL 500.

AGRON 855. Soil Organic Chemistry. (3) II, in even years. The basic physical-chemical properties and reactivities of soil organic matter and organic chemicals, the fundamental processes controlling the fate of organic chemicals, and the methods for estimating their environmental behavior in the soilwater system. Pr.: CHEM 350 and AGRON 605.

AGRON 860. Applied Plant Breeding. (3) II. This course considers in detail the mechanics of an applied plant breeding program for agronomic crops. Pr.: AGRON 630 or HORT 740, AGRON 770, and STAT 703.

AGRON 893. Agricultural Simulation Modeling. (4) I, in odd years. Techniques for developing and testing computer simulation models for research, management, and design applications in agriculture. Three lectures and one three-hour work session per week. Pr.: MATH 211, STAT 705, and AGRON 455 or equivalent.

AGRON 898. Master's Report. (2) I, II, S. Preparation of a written report either of research or of problem work on a topic in the major field.

AGRON 899. Master's Research. (Var.) I, II, S. Research on a problem which may extend throughout the year and furnish data for a master's thesis.

AGRON 900. Biometeorology. (3) II, in even years. A comprehensive analysis of interactions between living organisms and their physical environment. Emphasis is placed on characterizing the transport of heat, water, and carbon within the soil-plant-atmosphere continuum. Includes discussions on aerodynamic transfer, surface energy balances, evapotranspiration, and soil-plant-watcr relations. The potential impact of climatic change on biosphere productivity will be considered. Three hours rec. a week. Pr.: MATH 211 or 220, PHYS 115, and AGRON 746 or BIOL 500.

AGRON 901. Environmental Instrumentation. (3) II, in odd years. A laboratory practicum on the methodology and instrumentation used to measure environmental parameters. Includes discussions on instrument selection, sensor deployment, and data acquisition. Measurement of temperature, radiation, moisture, wind, CO2, and surface energy fluxes will be considered. Two hours rec. and two hours lab a week. Pr.: MATH 210 or 220, PHYS 115, and AGRON 746 or BIOL 500.

AGRON 905. Advanced Soil Chemistry. (3) I, in even years. Application of physical chemistry to soils; cation and anion equilibria, cation activities, electrokinetics, sorption, and other physiochemical reactions in soils. Two hours rec. and three hours lab a week. Pr.: AGRON 705, 746, and CHM 585.

AGRON 910. Topics in Plant Breeding. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. Joint listing with Department of Horticulture. See HORT 910.

AGRON 916. Advanced Soil Physics. (3) II, in odd years. An advanced study of the transport of water, heat, and solutes in soil. The theory of unsaturated water flow, coupled heat and water flow, and the convection and dispersion of reactive solutes will be studied in detail. Spatial variability of soil physical properties will be discussed, solute transport will be presented. Three hours rec. a week. Pr.: AGRON 816, MATH 240, and PHYS 113.

AGRON 925. Advanced Soil Genesis and Classification. (2) II, in odd years. An advanced study of processes of soil formation and systems of soil classification including soil taxonomy. Two hours rec. a week. Pr.: AGRON 515.

AGRON 930. Topics in Plant Genetics. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. Joint listing with Department of Horticulture. See HORT 930.

AGRON 935. Topics in Soils. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor.

AGRON 945. Soil Mineralogy. (4) I, in odd years. Theory and application of methods for analyzing minerals in soil environments, including X-ray, electron optical, thin section, and wet chemical techniques. Two hours rec. and six hours lab a week. Pr.: AGRON 705.

AGRON 950. Advanced Crop Ecology. (3) II, in even years. Principles of growth and development of crops in relation to the environment. Three hours rec. a week. Pr.: BIOL 500, 529, and STAT 704, 705.

AGRON 955. Soil Microbial Ecology. (3) II, in even years. Theories and concepts of the ecology and function of microorganisms in the soil environment. Discussions will include factors regulating microbial activity, the flow of energy (carbon), and nitrogen transformations as they relate to plant productivity and environmental quality. Three hours rec. a week. Pr.: AGRON 645 and BIOCHEM 521.

AGRON 960. Topics in Crop Physiology and Ecology. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor.

AGRON 970. Advanced Plant Breeding I. (3) I, in odd years. Role of quantitative genetics in plant breeding, heritability, mating designs, selection techniques and theory, population improvement, breeding autopolyploid crops. Pr. AGRON 860 and AGRON 830 or concurrent enrollment.

AGRON 980. Advanced Plant Breeding II. (3) I, in even years. Role of biotechnology in plant breeding, mapping and linkage, genetic distances, marker assisted selection, crop evolution and origin, germplasm conservation and utilization, genotype x environment interaction, stability analysis. Pr.: AGRON 860 or ASI 500.

AGRON 999. Ph.D. Research. (Var.) I, II, S. Research on a problem which may extend throughout the year and furnish data for a doctoral dissertation.

For more information

For additional information and application materials please contact:
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2004 Throckmorton Plant Sciences Center
Manhattan, KS 66506–5501
Home page: http://www.ksu.edu/agronomy/

Anatomy and Physiology

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Deryl Troyer, DVM, Ph.D., Kansas State University.
A. Philine Wangemann, Ph.D., Albert-Ludwigs University, Freiburg, Germany.
Mark Weiss, Ph.D., University of Pennsylvania–Philadelphia.
Ruth Welti, Ph.D., Washington University in St. Louis.
Jane A. Westfall, Ph.D., University of California.

Program of study

The Department of Anatomy and Physiology offers opportunities for graduate studies leading to both M.S. and Ph.D. degrees. Cardiopulmonary physiology, immunophysiology, neuroscience, and pharmacology are the major themes of research of the department. Specific areas of interest include comparative exercise physiology, food animal immunophysiology, molecular biology of membranes, mechanisms of stress phenomena, molecular genetics and gene mapping, neural control of cardiovascular function, and pathophysiology of microcirculation. Faculty from other departments comprise a strong ancillary support group. Career options available with an advanced degree in anatomy or physiology include academic positions in various animal and human health science-related institutions such as colleges of veterinary medicine and schools of medicine and dentistry, as well as positions in industry and agribusiness.

Admissions

To be admitted with full standing, the applicant must have an average of B or better in the junior and senior years, a bachelor's or

veterinary medical degree from an approved institution, and adequate undergraduate preparation in the proposed field. Study toward the master of science degree is ordinarily limited to students concurrently enrolled in the veterinary degree program.

For the master of science degree, applicants must complete a minimum of 30 hours of credit, which includes 6 to 8 hours of research credit. Applicants with a bachelor's degree who are concurrently pursuing a DVM degree may apply 12 hours from relevant courses toward both the master's and DVM degrees if the grades in these courses are adequate. Applicants already possessing the DVM degree can likewise select 12 hours from the professional curriculum to be applied toward the M.S. degree.

For the Ph.D. degree, 90 semester hours of graduate study beyond the bachelor's degree are required, including at least 30 hours of research. For DVM candidates, if 12 hours of dual credit has not been applied to the master of science degree, it may be applied toward the Ph.D.

Application procedure

See Veterinary Medicine in this catalog for additional information.

Applications are considered on a rolling basis. However, students applying for financial support and international students are encouraged to apply as early as possible. Teaching and research assistantships are awarded on the basis of merit and availability, using many of the same criteria used for admission decisions. All students offered admission are considered for financial support.

Anatomy and physiology courses

AP 601. Cardiorespiratory Exercise Physiology. (3) I. An examination of the structure and function of the respiratory system and the manner in which oxygen passes from the atmosphere to its site of utilization in the mitochondria. Exercise and environmental stresses will form the basis for examining the capacity, plasticity and limitations to respiratory function. Pr.: KIN 250 and KIN 335. Cross listed with Kinesiology; see KIN 601.

AP 603. Cardiovascular Exercise Physiology. (3) II. Study of the structure and function of the cardiovascular system as it pertains to acute and chronic exercise. Topics include the control of blood pressure, vascular volume and blood flow during orthostasis and exercise. Pr.: KIN 250 and KIN 335. Cross-listed with Kinesiology; see KIN 603.

AP 700. Gross Anatomy I. (6) I. Gross dissection of the dog with comparative aspects of the cat. Three hours lec. and nine hours lab a week. Pr.: First-year standing in College of Veterinary Medicine.

AP 705. Gross Anatomy II. (6) II. Gross dissection of the horse and ruminant with comparative aspects of the pig, laboratory animals, and the chicken. Three hours lec. and nine hours lab a week. Pr.: AP 700.

AP 710. Microscopic Anatomy I. (5) I. Origin, development, and microscopic structure and appearance of the cells and tissues of the animal body. Three hours lec. and six hours lab a week. Pr.: First-year standing in College of Veterinary Medicine.

AP 720. Veterinary Neuroscience. (2) II. Study of the normal neuroanatomy, neurophysiology and introductory neuropharmacology of the central nervous system of common domestic mammals. Pr.: First-year standing in the College of Veterinary Medicine or BIOL 505 or equiv.

AP 737. Veterinary Physiology I. (5) Function of the animal body at the cellular level, including nerve and muscle function. Basic pathophysiological mechanisms will be emphasized and correlated with clinical topics. Four hours lec., three hours lab a week. Pr.: First-year standing in College of Veterinary Medicine or consent of instructor.

AP 747. Veterinary Physiology II. (6) II. Function of the cardiovascular, endocrine, respiratory, renal, and reproductive systems of domestic animals with emphasis on physiologic control mechanisms, interrelationships of body systems, and criteria for evaluating animal health. Four hours lec. and six hours lab a week. Pr.: AP 737.

AP 770. Pharmacology. (5) I. The basic principles of pharmacology, the interaction of drugs and living systems which includes: the action of the drug upon the animal's systems, and the actions of the animal's body upon the drug. The application of these principles to the safe and efficacious use of drug regimens in veterinary medical and surgical patients. Four hours lec. and three hours lab a week. Pr.: AP 737 and 747 or equiv.

AP 773. Bioinstrumentation Laboratory. (1) I, in even years. Practical experience with and evaluation of laboratory and clinical techniques related to electrodes, transducers, and monitoring equipment. Emphasis is on instrumentation for the respiratory, cardiovascular, and nervous systems. Three hours lab a week. Pr.: AP 747 or equiv., or conc. enrollment in EECE 773.

AP 778. Respiratory Function in Health and Disease. (3) II, in even years. A comprehensive overview of normal respiratory physiology in mammals with clinical application to the recognition of obstructive, restrictive, infectious, and allergic diseases, and the management of mechanical ventilation and oxygen therapy. Pr.: AP 747 or equiv.

AP 790. Problems in Anatomy and Physiology. (Var.) I, II, S. Introduction of undergraduate and M.S. graduate students to research involving various anatomical and physiological systems. Pr.: Consent of instructor.

AP 796. Topics in Kinesiology. (1–4) On sufficient demand. Intensive study of a selected topic in kinesiology involving either greater in-depth study, or application of theory presented in a related course. May be repeated as topic varies. Pr.: 6 hours in kinesiology 500 and above. Only 6 hours may be counted toward degree. Cross-listed with Kinesiology. See KIN 796.

AP 800. Advanced Physiology of Exercise. (3) II. An in-depth study of the physiological responses of the human body during exercise, the adaptations that occur with exercise training, and the laboratory techniques to assess these responses and adaptations. Pr.: KIN 335. Cross-listed with Kinesiology. See KIN 800.

AP 803. Seminar. (1) I, II, S. Designed primarily for graduate and senior students enrolled for graduate credit in physiology. Each student is required to give a report on some subject related to physiology. The course is intended to stimulate interest in research and evaluation of data. One hour a week. Pr.: Consent of staff.

AP 825. Special Anatomy. (Var.) I, II, S. The gross and/or microscopic study of any system (or systems) of any domestic animal. Pr.: AP 700 or 710 or equiv. and consent of staff.

AP 850. Anatomical Techniques. (1–2) I, in odd years, S. Pr.: Consent of staff.

AP 860. Neuroscience. (2) I. An advanced multidisciplinary study of the central nervous system, including neurochemistry, neuropharmacology, neuroanatomy, neurophysiology, clinical neurology, and behavioral science. Pr.: Consent of staff.

AP 861. Ultrastructural Interpretation of the Nervous System. (3) II. Study of the fine structure of neurons, axons, synapses, neuroglia and choroid plexus, the interconnections among neurons, the location of specific tracers and antibodies which define synaptic terminals, and a survey of methodologies used with transmission electron microscopy. Pr.: Biol. 541 or AP 710.

AP 865. Physiologic Constituents of Body Fluids. (2) I, II, S. Analysis of body fluids, with application to specific and fundamental problems in veterinary medicine. One hour rec. and one to three hours lab a week. Pr.: AP 747 and consent of staff.

AP 870. Advanced Cardiovascular Physiology. (2) I. in odd years. Comprehensive overview of cardiovascular physiology in domestic animals with special emphasis on the dog and horse, including current research. Pr.: AP 747 or equiv.

AP 880. Mechanisms of Drug Action. (3) I, in even years. Discussion of pharmacologic mechanisms at the molecular and cellular level, including receptors, second messengers, and pharmacokinetics. Specialized areas of pharmacology such as neuropharmacology and drug design will be discussed. Areas of current research interest will be emphasized. Pr.: BIOCH 521.

AP 886. Clinical Nutrition. (3) II. The clinical aspects of nutrition as it relates to (a) medical and surgical management of diseased and convalescent animals (therapeutic nutrition), and (b) programs of disease prevention of the common domestic species of food producing, companion animals, pet birds, and exotic animals (nutritional preventive medicine). Same as ASI 886 and CS 886. Pr.: Third-year standing in College of Veterinary Medicine.

AP 888. Advanced Neuroendocrinology. (2) II, in even years. A study of the chemical link between the brain and the endocrine system; the roles of brain peptides, neural pathways, and centrally acting drugs in the release of hormones, hormonal involvement in reproduction, aging, breast cancer, stress, etc.; a survey of the new and evolving concepts and techniques in neuroendocrinology. Two hours lec. a week. Pr.: AP 747 or BIOL 710 or equiv.

AP 890. Problems in Pharmacology. (Var.) I, II, S. Individual investigations of the interactions of pharmaceutical compounds with living systems. Pr.: AP 770.

AP 891. Beef Nutritional Health and Feeding Management. (1) I, II. Veterinary medical aspects of nutrition and feeding management of beef cattle, with consideration of therapeutic nutrition related to clinical management of diseased and convalescent animals and nutritional programs of disease prevention in applied production. Pr.: AP 886 or equiv.

AP 892. Dairy Nutritional Health and Feeding Management. (1), I, II. Veterinary medical aspects of nutrition and feeding management of dairy cattle, with consideration of therapeutic nutrition related to clinical management of diseased and convalescent animals and nutritional programs of disease prevention in applied production. Pr.: AP 886 or equiv.

AP 893. Equine Nutritional Health and Feeding Management. (1) I, II. Veterinary medical aspects of nutrition and feeding management of horses, with consideration of therapeutic nutrition related to clinical management of diseased and convalescent animals and nutritional programs of disease prevention in applied production and horse care. Pr.: AP 886 or equiv.

AP 895. Equine Exercise Physiology. (2) I, in even years. Comprehensive overview of the physiology of exercise in the horse with comparison to other species. Emphasis will be on cardiovascular, respiratory, and musculoskeletal systems, including current research. Pr.: AP 747 or equiv.

AP 898. Master's Report. (2) I, II, S. Pr.: Consent of staff.

AP 899. Research. (1–4) I, II, S. For graduate students in the field of anatomy or physiology working toward the M.S. degree. Pr.: Consent of staff.

AP 901. Molecular Neurobiology. (2) II, in odd years. Topics of neurobiology are covered from a molecular perspective, including neurotransmitters and neuromodulators, the synapse, G-coupled receptors, pumps, ligand-gated and voltage-gated channels, sensory transduction, the action potential and other relevant phenomena. Pr.: BIOCH 521.

AP 915. Histophysiology of Nutritional Deficiencies. (3) I, II, S. The study of changes occurring in tissues from nutritional deficiencies. Two hours rec. and three hours lab a week. Open to graduate students and veterinary students earning graduate credit. Pr.: Consent of staff.

AP 925. Advanced Physiology. (3–5) I, II, S. The principles and techniques in the investigation of bioelectrical phenomena in relation to: (a) the physiology of the digestive organs, (b) myophysiology, (c) endocrinology, and (d) neurophysiology. Advanced physiological experiments will be conducted to provide an understanding of the applications of electronic equipment. Rec. and two three-hour labs a week. Pr.: AP 747 and consent of staff.

AP 935. Comparative Neuroanatomy. (3) II, in odd years. Study of the structure and function of the nervous system of animals representing all phyla of the animal kingdom. Special emphasis is given to the study of vertebrates including man. Pr.: BIOL 505 or equiv.

AP 995. Problems in Physiology. (Var.) I, II, S. Special problem-involving techniques utilized in studying the function of various organ systems of the body. Pr.: Consent of instructor.

AP 999. Research in Physiology. (I–6) I, II, S. For graduate students working toward the Ph.D. degree. Pr.: Consent of staff.

For more information

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Animal Sciences and Industry

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Jeffrey S. Stevenson, Ph.D., North Carolina State University.
Gerald L. Stokka, D.V.M., Iowa State University.
Janice C. Swanson, Ph.D., University of Maryland.
Evan C. Titgemeyer, Ph.D., University of Illinois.
Mike D. Tokach, Ph.D., University of Minnesota.
John A. Unruh, Ph.D., Kansas State University.

Program description

The Department of Animal Sciences and Industry is a comprehensive unit supported by about 50 faculty devoted to research, teaching, and extension activities related to domestic farm animals species. Currently, the department has approximately 750 undergraduate students advised in the department and about 100 graduate students pursuing both M.S. and Ph.D. degrees.

For graduate training, the department has animal research and teaching units located conveniently to the main campus. Those units include sheep, poultry, purebred beef, dairy, swine, and horse teaching and research units and the beef, forage, range and cow-calf research units. In addition, laboratories in both Call and Weber Halls contain state-of-the-art equipment that allow the student access to most analytical techniques required for their research.

Graduate training in the Department of Animal Sciences and Industry is organized within six functional discipline groups including animal breeding and genetics, food science, meat science, monogastric nutrition, physiology, and ruminant nutrition.

Animal breeding and genetics
Graduate work leading to M.S. and Ph.D. degrees in animal breeding is administered by participating faculty. Graduate programs are designed specifically for each student to acquire training in genetics, animal breeding, and statistics. Additional courses will be selected from the fields of biological and physical sciences. A typical program of study will include some of the following graduate level courses: statistical and population genetics; animal breeding; statistics and experimental design; physiology; and anatomy. Research is conducted using field data from cooperating ranches, breed association, and universities. Facilities are available for adequate analysis of most data set, including REML and BLUP procedures.

Food science
The food science program represents a large interdisciplinary degree program and is detailed in a separate area in the catalog.

Meat science
The meat science program is comprehensive and prepares students for fundamental and applied research, product and process development, and technical service in industry, academic, regulatory, and international positions. Faculty conduct research in tissue growth and development; germplasm characterization; ante- and post-mortem factors and processes affecting meat quality and composition; myofibrillar, collagen, and pigment chemistry; packaging; lighting; irradiation; low-fat products; by-product value enhancement; processed meats; quality assurance; and safety of meat and meat products. Facilities include a fully equipped meat laboratory that permits experimental and industry-like fresh and processed meat processing; research laboratories for physical and chemical analyses; and thermal processing, display, and sensory facilities for instrumental and sensory panel evaluation of meat products. Graduate students are actively involved in teaching, research, and extension activities as part of their training.

Monogastric nutrition
The monogastric nutrition team offers comprehensive training that weaves a basic understanding of nutrition into an applied research program. Areas of specialized emphasis include: amino acid nutrition as influenced by age, sex, weight, and physiological state of the animal; utilization of alternative feed ingredients; influences of technological advances on nutritional requirements; effects of revolutionary feed processing technologies on nutrient utilization; and manipulation of the immune response through the diet. Innovations by the K-State monogastric nutrition team include phase feeding programs for the young pig, high nutrient density starter diets, particle size and extrusion processing to improve nutrient utilization in both swine and poultry diets, and somatotropin influences on nutrient requirements. Additionally, K-State is a national leader in conducting field research in modern commercial swine facilities. This allows graduate students to be exposed to the swine business while conducting timely and industry-leading research.

Graduate students are offered an array of course work to develop areas of expertise. Common areas of training include basic nutrition, biochemistry, statistics, grain science, and immunology. Seminars and discussion groups are an integral part of the graduate program. Prospective graduate students should visit with the faculty and current graduate students about opportunities in the program.

Physiology
Students pursuing M.S. and Ph.D. programs in physiology in the Department of Animal Sciences and Industry will be exposed to a comprehensive, interdisciplinary degree program including course work, seminars and research experiences spanning many departments including biochemistry, statistics, biology, and anatomy and physiology.

Graduate training in physiology prepares students for various careers in research, teaching, technical services, consulting, adult education, and extension in animal reproduction and related fields of animal physiology. Graduate studies will be in reproductive endocrinology, establishment of pregnancy, cell and tissue culture, molecular biology of reproduction, stress-environmental physiology, gamete physiology, and exercise physiology.

Ruminant nutrition
The ruminant nutrition program is characterized by highly productive individual research programs and a concomitant commitment to the pursuit of collaborative research efforts. Scientists within the ruminant nutrition program maintain the dual goals of conducting research which will advance the understanding of fundamental nutritional phenomena but which also provide insight into practical aspects of the nutritional management of ruminant livestock. Students entering the program are provided with a strong foundation in ruminal and post-ruminal digestion, absorption, and metabolism as well as training in the fundamental experimental procedures necessary for conducting ruminant nutrition research.

Supporting course work is frequently pursued in the areas of biochemistry, grain science, microbiology, physiology, and statistics. Areas of research emphasis within the ruminant nutrition group include dairy cattle nutrition, feedlot nutrition, cow-calf and stocker nutrition (special emphasis on grazing livestock), rumen microbiology, and silage research.

Admission

Application for admission to graduate school should begin as early as possible in the semester prior to the proposed admission date (i.e., for fall semester, begin application process early in the preceding spring semester).

All applicants must submit a completed application form, three letters of recommendation, and official transcripts of all previous college work. In addition, the applicant should write a short statement of objectives which should include the discipline area (and animal species if appropriate) in which the student desires to study. The student should mention in the statement of objectives specific faculty with whom they may have had prior contact, and with whom they desire to work as graduate students. This information is important in placing prospective graduate students with major professors whose area of research coincides with their areas of interest.

In addition to the information noted above, international applicants must submit a TOEFL score of at least 550 (or 213 if computer-based test) or provide evidence of receipt of a degree from a U.S. university.

International students must also provide a completed financial form and evidence of financial support for their entire graduate training.

The Graduate Record Examination is not required for admission, but may be helpful in the evaluation process.

Upon receipt of all of the required application documentation, the applicants file will be reviewed by the departmental graduate activities committee which includes graduate faculty members representing each of the six discipline areas. If the student is deemed acceptable for admission, a graduate faculty member willing to serve as major professor must be identified prior to forwarding of the students credentials to the graduate school.

Limited numbers of graduate research assistantships and graduate teaching assistantships are available on a competitive basis. Those students awarded an assistantship have out-of-state fees waived. Current annual stipends for GRAs at the Ph.D. level are $11,400 and at the M.S. level are $10,200. The current stipend for GTAs is $8,603 for nine months, regardless of the degree sought by the applicant.

Animal science and industry courses

The M.S. or Ph.D. program of study shall include supportive course work from several departments including statistics, biochemistry, anatomy and physiology, biology, grain science and others. Graduate level courses offered in the Department of Animal Sciences and Industry are listed below.

Undergraduate and graduate credit in minor field

ASI 500. Genetics. (3) I, II, S. An introduction to Mendelian, molecular, quantitative, and population genetics. Three hours lec. a week. Pr.: BIOL 198 or 210.

ASI 501. Food Chemistry. (3) II. An in-depth coverage of the chemical structures of major food components and the chemical reactions occurring during storage and processing. Two hours lec. and three hours lab a week. Pr.: CHEM 350 and BIOCH 521.

ASI 503. Topics in Comparative Pathology. (1–3) I, II, S. Selected topics in diseases of laboratory animals, wildlife, and fish for non-veterinary students. Pr.: BIOL 198. Same as AP 500.

ASI 504. Equine Reproduction Management. (2) II. Theory and practice in reproductive management and breeding techniques of the horse. Includes basic reproductive physiology of the stallion and mare, demonstration and practice in semen collection and processing, teasing systems, natural and artificial breeding techniques, management, and record keeping. Six hours lab a week. Pr.: ASI 400 or equiv. and senior standing.

ASI 505. Food Science: Chemistry and Application. (3) II. Composition, structure and properties of foods. Chemical interactions affecting texture, color, flavor, and stability during processing and storage. Two hours rec. and three hours lab a week. Pr.: CHM 350 and 351; BIOCH 521 and 522.

ASI 510. Animal Breeding Principles. (3) I, II. The genetic principles in evaluation, selection and mating systems used in beef, dairy, sheep, swine, poultry and horse breeding. Intended for ASI majors. Three hours lec. a week. Pr.: ASI 500.

ASI 512. Bovine Reproductive Technologies. (2) I. Reproductive technologies used in management of cattle including the physiology of the estrous cycle, embryo viability, and fetal development. Practical training in reproductive management technique. One hour lec. and five hours lab a week. Pr.: ASI 400, senior standing and consent of instructor.

ASI 515. Beef Science. (3) I, II. A comprehensive course covering all phases of the beef cattle industry. Practical application of nutrition, breeding, physiology of reproduction, merchandising, risk management and related areas. Special emphasis on management systems of raising, growing and finishing beef cattle. Pr.: Senior standing.

ASI 521. Horse Science. (3) II. A study of the horse industry in the U.S., breed profiles, anatomy and evaluation, nutrition, reproduction, growth and development, health, excercise physiology, facilities and equipment, business considerations. Three hours lec. a week. Pr.: Junior standing.

ASI 524. Sheep Science. (3) I. Application of scientific management principles to the sheep industry. Breeding, reproduction, nutrition, health, facilities and economic aspects as related to sheep production. Two hours lec. and two hours lab a week. Pr.: Junior standing.

ASI 533. Anatomy and Physiology. (4) II. General anatomy and physiology of the domestic animals. Three hours rec. and three hours lab a week. Same as AP 530.

ASI 534. Introduction to Pharmacology of Farm Animals. (2) II, in even years. The study of the basic principles of pharmacology as related to the proper and safe use of drugs and chemicals by the livestock industry. Same as AP 531.

ASI 535. Swine Science. (3) I, II. Application of basic scientific principles to the economical production of pork. Recommendations are made in breeding, reproduction, nutrition, health, housing, marketing, and management of swine production units of varying sizes. Two hours lec. and two hours lab a week. Pr.: Senior standing.

ASI 540. Principles of Animal Disease Control. (3) II. A study of the factors that influence animal health and disease control for students majoring in agriculture and other fields. Three hours lec. a week. Pr.: ASI 533. Same as CS 540.

ASI 580. Animal Sciences and Industry Seminar. (1) I. Open only to senior students majoring in animal sciences and industry. One hour rec. a week.

ASI 595. Contemporary Issues in Animal Science and Agriculture. (3) II. The development and management of current issues affecting animal agriculture and science in three primary areas: 1) how do issues develop; 2) the political aspects of issues; and 3) the development of expertise based on objective assessment. Current issues such as animal welfare/rights, environment, genetic engineering, etc., will be used to provide students with practical learning experiences. Pr.: Junior standing.

ASI 599. Animal Science Internship. (1–6) I, S. Industry work-study experiences in beef cattle, sheep, dairy cattle, swine, horse or poultry production operations or in animal food products plants. Pr.: Permission of supervising faculty member.

Undergraduate and graduate credit

ASI 601. Milk Secretion. (3) I. Anatomy and histology of the mammary gland. Physiology of lactation, milk constituents, and management practices that alter quality and quantity. Contemporary milking practices and mastitis control. Two hours lec. and two hours lab a week. Pr.: ASI 103, 318 and 533.

ASI 603. Food Science Internship. (1–6) I, II, S. Supervised professional field experience in food science. Pr.: Consent of supervising instructor. Same as FN 601.

ASI 605. Fresh Meat Operations. (3) I. Provides information and exposure to fresh meat operations, including: fabrication, yields, costs, quality assurance, packaging, marketing of fresh meat and by-products. Two hours lec. and three hours lab a week. Pr.: ASI 350.

ASI 607. Food Microbiology. (4) I. This course deals with the identification, enumeration and characterization of bacteria, yeast and mold associated with foods and food processing. Effects of physical and chemical agents on microorganisms will be studied. Microbiological problems in food spoilage, food preservation, food fermentation, and food-borne diseases will be discussed. Two hours lec. and two two-hour labs a week. Pr.: BIOL 455.

ASI 608. Dairy Foods Processing and Techonology. (3) II. The fundamental technologies used to process high quality dairy foods using freezing, heat membrane and pressure technologies. Changes in milk chemistry, microbiology and structure will be emphasized during the processing of butter, soft and hard cheeses, concentrated milks, ice cream and yogurt. Two hours of lecture and one three-hour lab a week. Pr.: BIOL 455.

ASI 609. Dairy Cattle Nutrition. (2) I. Application of principles of nutrition to feeding dairy cattle; least cost formulation of balanced rations; discussion of current dairy cattle nutrition research. One hour lec. and two hours lab a week. Pr.: ASI 320.

ASI 610. Processed Meat Operations. (2) II. An intensive course in processed meats, relating the science, technology and quality control of curing, smoking and sausage manufacture. One hour rec. and two hours lab a week. Pr.: ASI 350.

ASI 611. Beef Cattle and Sheep Nutrition. (2) II. A detailed study of the nutrient requirements of beef cattle and sheep for various stages of growth, reproduction and lactation. Emphasis will be given to inter-relationships between nutrition, disease, management and environment. Diets will be formulated using a wide range of feed ingredients to produce optimum production at minimum cost. Current beef cattle and sheep nutrition research will also be reviewed. One hour lec. and two hours lab a week. Pr.: ASI 320.

ASI 612. Horse Nutrition. (2) I. A detailed study of the nutrient requirements of horses for various stages of growth, work, reproduction, and lactation. Ration formulation using various feed ingredients. Relationships among nutrition, feed-related diseases, environment and management. Review of current horse nutrition research. One hour lec. and two hours lab a week. Pr.: ASI 320.

ASI 614. Swine and Poultry Nutrition. (2) I. A detailed study of nutrient requirements of swine and poultry, for various stages of production. Lectures will include interrelationships between nutrition and other factors (environment, management and disease) that affect performance. Labs will emphasize evaluation of feed ingredients, diets, premixes and base mixes. One hour lec. and two hours lab a week. Pr.: ASI 320.

ASI 615. Range Livestock Nutrition and Management. (2) II. A detailed study of nutritional management concepts relevant to range livestock production. Emphasis will be directed toward discussion of range forage quality, range forage intake, nutrient requirements of range livestock, supplementation systems, grazing systems, computer-aided management procedures, stocking rates and reproductive management. Two hours lec. a week. Pr.: ASI 320.

ASI 620. Livestock Production and Management. (2) II. Student involvement in laboratory exercises related to practical livestock production and management. One hour rec. and four hours lab a week. Pr.: Appropriate ASI course (515, 521, 524 or 535).

ASI 621. Dairy Cattle Management. (3) II. Integration of biologic and economic aspects of dairy production with dairy farm organization, planning, operation and analysis. Field trips, dairy farm analysis and case studies will be used to supplement lec. material. Two hours rec., two hours lab a week. Pr.: ASI 102 and 106, senior standing.

ASI 630. Egg Science. (2) I, in even years. Emphasis on the technical problems in processing and distribution of shell eggs and egg products. This course covers the chemistry and microbiology of shell eggs and egg products. Processing operations and basic principles of quality assurance are covered. Importance of new product development is discussed. Pr.: ASI 104 and 302.

ASI 635. Poultry Meat Technology. (2) II, in odd years. Emphasis on the technical problems that exist between production and consumption during the processing and marketing of poultry and poultry meat products. Two hours lec. a week. Pr.: ASI 104 and 302.

ASI 645. Poultry Management. (3) II, in odd years. A detailed study of the production and management practices involved in commercial poultry and game bird enterprises. Two hours rec. and one three-hour lab a week. Pr.: ASI 102, 104, and junior standing.

ASI 655. Behavior of Domestic Animals. (3) I. Behavior associated with domestication. Effects of selective breeding, physical and social environments, and developmental stage on social organization, aggressive behavior, sexual behavior, productivity and training of domestic animals. Physiology of behavior and abnormal behavior considered briefly. Two hours lec. and two hours lab a week. Pr.: BIOL 198 and junior standing.

ASI 661. Animal Sciences and Industry Problems. (1–3) I, II, S. Work offered in: animal breeding, animal nutrition, beef cattle production, dairy production, horse production, livestock evaluation, meats, poultry, sheep production, swine production. Pr.: Consent of instructor.

ASI 671. Meat Selection and Utilization. (2) I. Emphasis on meat cut identification, muscle and bone anatomy, grades, fabricated meat, institutional cuts, specification writing, processing, meat preparation and shrinkage costs. One hour lec.-rec. and two hours lab a week. Pr.: CHM 110 and 111.

ASI 690. Principles of HACCP. (1) II. Introduction to the Hazard Analysis and Critical Control Point system and its application in the food industry. Three hours lec., four hours working groups, and one hour rec. Per week for a three-week period. Pr.: CHM 110 and BIOL 198.

ASI 694. Food Plant Management. (3) I. The integration of food science knowledge in managing a food processing operation to produce high quality food products. Two hours lec. and two hours lab a week. Pr.: Senior standing .

ASI 695. Quality Assurance of Food Products. (3) I. The role of the control laboratory in maintaining standards and quality of dairy and food products and ingredients. Tests and techniques for evaluating quality and sanitation and for compliance with regulatory requirements. Two hours rec. and one three-hour lab a week. Pr.: One course in bacteriology.

ASI 710. Physiology of Reproduction in Farm Animals. (3) I, in odd years. The physiological aspects of reproduction in farm animals including endocrine inter-relationships controlling reproductive cycles and gamete production. Periodic demonstrations deal with specialized reproductive anatomy of farm animals, experimental techniques used in animal reproduction, and contemporary animal production practices. Three hours lec. a week. Pr.: ASI 400.

ASI 713. Rapid Methods and Automation in Microbiology. (2) Spring intersession. Rapid methods and automation is a dynamic area in applied microbiology dealing with the study of improved methods in the isolation, detection, characterization, and enumeration of microorganisms and their products in clinical, food, industrial, and environmental samples. The knowledge and techniques of this course are useful for students interested in medical, food, industrial, and environmental microbiology for early detection of beneficial as well as harmful microorganisms in their work.

ASI 720. Anaerobic Bacteriology. (2) II, in even years. Study of anaerobic bacteria, anaerobiosis, description of anaerobic techniques, and physiology and biochemistry of anaerobes of natural environment including gastrointestinal tract, and of veterinary, medical, and industrial importance. Two hours lec. a week. Same as BIOL 720. Pr.: BIOL 455 and BIOCH 521.

ASI 725. Food Analysis. (3) I, II. Principles, methods, and techniques necessary for quantitative, instrumental, physical, and chemical analyses of food and food products for off-campus students using an audio/video taped format. The analytical principles will be related to standards and regulations for food processing. Pr.: ASI 501.

ASI 727. Chemical Methods of Food Analysis. (2) I. Methods for quantitative, physical, and chemical analyses of foods and food products. Analytical techniques covered will include spectroscopy, chromatography, mass spectrometry, immunochemistry and atomic absorption. The analyses will be related to standards and regulations for food processing. Meets during first half of semester. Three hours lec. and three hours lab a week. Pr.: ASI 501 or FN 501.

ASI 728. Physical Methods of Food Analysis. (2) I. Principles of physical and chemical methods and instrumentation for measuring protein, fat, moisture, and ash content. Determination of fat and oil quality characteristics. Physical measurements of food properties: color, water activity, water holding capacity, textural characteristic. Determination of properties and stability of emulsions, foams, and gels. One hour rec., and three hours lab a week. Pr.: ASI 501.

ASI 730. Silage Technology. (2) I. A study of silage fermentation, nutrient conservation, aerobic deterioration process, factors affecting silage quality; and chemical analysis used to evaluate silage. Discussion of techniques used in silage research and assigned readings within the silage literature. Two hours lec. a week. Pr.: ASI 320.

ASI 749. Advanced Animal Breeding. (3) II. Application of genetic principles to livestock improvement, selection methods, mating systems, heritability estimates and methods of analyzing genetic data. Three hours lec. a week. Pr.: ASI 500 and three hours in statistics.

ASI 777. Meat Technology. (4) II. Meat composition, meat product safety and spoilage, quality assurance, meat processing techniques, sausage and formed products, color, packaging, plant planning and organization, field trip. Three hours lec. and three hours lab a week. Pr.: ASI 350 and 361; senior or graduate standing.

ASI 789. Advanced Application of HACCP Principles in the Food Industry. (1) II. Analysis of the physical, chemical, and biological hazards in food products and application in developing HACCP plans for the food industry. Three hours lec., four hours working groups, one hour rec., for a three-week period. Pr.: BIOL 455 and ASI 690.

ASI 791. Advanced Application of HACCP Principles in the Meat and Poultry Industry. (1) II. Analysis of physical, chemical, and biological hazards in meat and poultry products and application in developing HACCP plans for the meat and poultry industry. Three hours lec., four hours working groups, and one hour rec. Per week for a three week period. Pr.: BIOL 455 and ASI 690.

ASI 792. Advanced Principles of Hazard Analysis and Risk Assessment. (1) II. Application of the principles of hazard analysis and risk assessment in the HACCP system. Three hours lec., two hours working groups, and one hour rec. Per week for a three-week period. Pr.: BIOL 455 and ASI 690.

ASI 793. Validation of HACCP Plans. (1) II. Evaluation of control parameters and control methods in identifying HACCP critical control points and validating the effectiveness of critical control points, critical limits, monitoring tools, corrective action procedure, record keeping, and verification procedures in addressing biological, chemical, and physical hazards that may present in food products. Three hours lec., two hours working groups, and one hour rec. Per week for a three week period. Pr.: BIOL 455 and ASI 690.

ASI 794. HACCP and Inspection. (1) II. Application of the principles of the hazard analysis and critical control point system to the inspection of food products. Three hours lec., two hours working groups, and one hour rec. Per week for a three week period.: BIOL 455 and ASI 690.

ASI 799. Graduate Internship in Animal Sciences and Industry. (1–4) I, S. In-depth work-study experiences on beef cattle, sheep, dairy cattle, swine, horse or poultry production operations or in animal food products plants. Pr.: Permission of supervising faculty member.

Graduate credit

ASI 801. Hormonal Control of Reproduction, and Lactation. (3) I, in even years. Endocrine glands and their hormonal secretions that control reproduction and lactation in farm animals. Three hours rec. a week. Pr.: BIOCH 521 and ASI 710.

ASI 802. Gametes, Fertilization and Pregnancy in Farm Animals. (3) II, in odd years. Basic mechanisms of gamete production and fertilization, embryonic and fetal development, and the establishment, maintenance and termination of pregnancy. Two hours lec. and three hours lab a week. Pr.: BIOCH 521.

ASI 811. Food Fermentation. (4) II. Application of the principles of microbiology to the understanding of the fermentation of various categories of foods. Chemical, biochemical and microbiological changes under controlled and uncontrolled conditions. Two hours lec. and six hours lab a week. Pr.: BIOL 455.

ASI 815. Advanced Food Chemistry. (3) I. Relationship of chemical composition to properties and to physical and chemical stability of foods. Chemical reactions will be covered extensively. Special attention will be given to dairy and poultry products, red meats, vegetables, and cereal grains. Pr.: BIOCH 521, 522.

ASI 820. Rumen Metabolism. (3) II, in even years. Metabolism, absorption, digestion, and passage of nutrients in the rumen; factors affecting the environment of the rumen; certain aspects of rumen function and dysfunction; techniques used in rumen research. Three one-hour lec. A week. Same as DMP 868. Pr.: ASI 318 and BIOCH 521 or 755.

ASI 825. Stress Physiology of Livestock. (3) I, in even years. Integrative physiology of livestock during environmental, management, and pathological stresses. Three hours lec. a week. Pr.: ASI 533 and BIOCH 521.

ASI 826. Nutritional Physiology. (3) II. The course focuses on the structures and function of the gastrointestinal tract, with an emphasis on digestive physiology in the small intestine. Details of gastrointestinal tract secretion, regulation, digestion, and absorption of the major nutrient groups are emphasized with species comparisons. Three hours rec. a week. Pr.: BIOCH 521.

ASI 840. Techniques in Domestic Animal Behavior. (2) II, in even years. A combined seminar and laboratory type course. Current and classical studies reported and discussed, relationships between behavior and other disciplines explored and methods of data collection examined. Small-scale demonstration experiments planned, executed and reported orally and/or in scientific written style. One hour rec. and two hours lab a week. Pr.: ASI 655 and STAT 320.

ASI 860. Analytical Techniques—Sample Preparation and Beginning Analyses. (1) I. Sample collection, processing and handling methodologies will be addressed as they pertain to research methods in the animal sciences. Basic laboratory techniques, sample collection, and analyses of moisture and nitrogen will be covered. two hours lec., eight hours lab and one hour rec. a week for three weeks. Pr.: CHM 350.

ASI 861. Analytical Techniques—Mineral Analyses. (1) I. This course focuses on the analysis of minerals in common feedstuffs. This course will cover sample preparation and atomic absorption, emission, ultraviolet/visible and fluorimetric spectrophotometric methods of analysis of feedstuffs and biological fluids. Two hours lec., eight hours lab and one hour rec. a week for three weeks. Pr.: CHM 350.

ASI 862. Analytical Techniques—Carbohydrate and Lipid Analyses. (1) I. This course covers the analysis of carbohydrate and lipid components of feedstuffs and biological materials using conventional as well as HPLC and gas chromatographic methods. Two hours lec., eigh hours lab and one hour rec. a week for three weeks. Pr.: CHM 350.

ASI 863. Analytical Techniques—Radioisotope Use. (1) I, in even years. Study of radioisotope use in physiological applications of research in domestic animals including radioactive decay, detection methodology, and isotope dilution. Two hours lec., eight hours lab and one hour rec. a week for three weeks. Pr.: BIOCH 521.

ASI 864. Analytical Techniques—Immunoassays. (1) I, in even years. Study of measurement of biological substances and hormones utilizing enzyme-linked immunoassays (ELISA) and radioimmunoassays (RIA). Two hours lec., eight hours lab and one hour rec. a week for three weeks. Pr.: BIOCH 521.

ASI 890. Graduate Seminar in Animal Sciences and Industry. (1) I, II. Discussion of research and technical problems in the discipline. Attendance required of all departmental graduate students. Maximum of two hours may be applied toward an advanced degree.

ASI 898. Master's Report. (2) I, II, S. A written report of either research or problem work on a topic in the major field. Pr.: Consult major professor.

ASI 899. Master's Research in Animal Sciences and Industry. (Var.) I, II, S. Research leading to the completion of a master's thesis. Pr.: Consult major professor.

ASI 902. Topics in Animal Science. (Var.) I, II, S. Discussion and lectures on important areas and contributions in the field of animal science not covered in present courses. Pr.: Consent of instructor.

ASI 905. Lipids on Food Systems. (2) II, in alternate years. Physical and chemical characteristics of lipids with emphasis on their behavior and function in food systems. Pr.: ASI 815.

ASI 906. Food Proteins. (2) II, in even years. Behavioral and function of plant, animal, and nonconventional proteins in food systems. Pr.: ASI 815.

ASI 907. Food Dispersions. (1) II, in odd years. Properties of food dispersions, food sols, gels, batters, emulsions, and foams. Pr.; ASI 815.

ASI 908. Carbohydrates in Food Systems. (2) II, in even years. Properties and functions of sugars and starches, and characteristics of edible plant tissues and pigments. Pr.: ASI 815.

ASI 915. Food Toxicology. (2) II, in odd years. This course deals with the study of occurrence, detection, and control of microbial toxins and chemical toxins in fresh and processed foods. The genetics, physiology, and mechanisms of toxin production by microbial cells and the chemistry, formation, and interactions of chemical toxins with food systems during food processing will be addressed. Two hours lec. a week. Pr.: ASI 607 and 715.

ASI 920. Energy Utilization in Domestic Livestock. (2) I, in odd years. Comprehensive discussion of the development and application of energy systems used to guide livestock feeding, procedures used in energy experimentation, dietary/digestive/environmental factors that influence efficiency of energy utilization, and the efficiencies with which different energy substrates are used to support various maintenance and production functions. Emphasis will be placed upon ruminants. Two hours lec. a week. Pr.: BIOCH 521.

ASI 921. Protein and Amino Acid Utilization in Domestic Livestock. (2) I, in even years. Comprehensive discussion of protein and amino acids and their role in digestion, absorption, metabolism, protein synthesis, and degradation in livestock. Emphasis on techniques and interpretation of results from experiments designed to evaluate protein utilization and factors which influence amino acid metabolism in monogastrics and ruminants. Two hours lec. a week. Pr.: ASI 820 or 826.

ASI 923. Vitamin and Mineral Nutrition of Domestic Livestock. (2) II, in even years. A detailed examination of the vitamin and mineral nutrition of domestic livestock. Emphasis will be placed on current literature on the determination of vitamin and mineral requirements, practical considerations for vitamin and mineral supplementation in livestock feeding, and the potential for vitamin and mineral deficiency and toxicity in domestic livestock. One hour lec. and two hour lab a week. Pr.: ASI 820 or 826.

ASI 925. Rumen Microbiology. (3) II, in odd years. Three hours lecture a week dealing with the microorganisms of the rumen, their habitat, diversity, structure, interactions, and biochemical activities. Techniques for enumeration, isolation and identification of ruminal microorganisms. Same as DMP 869. Pr.: BIOL 455.

ASI 930. Advanced Meat Science. (3) I. On sufficient demand. Basic biochemical, physiological, and histological properties of muscle and related tissues; muscle contraction, rigor mortis, and muscle hydration; maturation; processing by thermal, dehydration, and cold sterilization techniques; meat flavor chemistry; meat research techniques. Three hours rec. a week. Pr.: ASI 777 or equiv.; and a course in biochemistry.

ASI 961. Graduate Problem in Animal Sciences and Industry. (Var.) I, II, S. In-depth study of a topic supervised by a member of the graduate faculty. Pr.: Permission of supervising faculty member.

ASI 990. Seminar in Animal Sciences Research. (1) I, II. Weekly evaluation of the scientific literature and the reasoning underlying the selection of research problems, the formulation and testing of hypotheses, and the evaluation and presentation of results. Pr.: Approval of major professor.

ASI 999. Doctoral Research in Animal Sciences and Industry. (Var.) I, II, S. Research leading to the completion of a Ph.D. degree. Pr.: Consult major professor.

For more information

For additional information and application materials please contact:
Dr. J. Ernest Minton
Chairman, Graduate Activities Committee
Department of Animal Sciences and Industry
Kansas State University
253 Weber Hall
Manhattan, KS 66506–0201
E-mail: eminton@oz.oznet.ksu.edu
Home page: http://www.oznet.ksu.edu/dp_ansi

Anthropology

See Sociology.

Apparel, Textiles, and Interior Design

Department head
Janice Huck (acting)

Director of graduate studies
Elizabeth McCullough

Graduate faculty
Marilyn M. Bode, Ph.D., Iowa State University.
Linda Cushman, Ph.D., University of Tennessee.
Barbara M. Gatewood, Ph.D., Purdue University.
Sherry Harr, Ph.D., Virginia Tech.
Janice Huck, Ph.D., Kansas State University.
Mary Stone Lamb, M.S., Arizona State University.
Melody L. A. LeHew, Ph.D., University of Tennessee
Elizabeth McCullough, Ph.D., University of Tennessee.
Deborah J. C. Meyer, Ph.D., Iowa State University.
Deanna M. Munson, Ph.D., Kansas State University.
Ludwig Villasi, M.S., Wayne State University.
Betty Jo White, Ph.D., Virginia Polytechnic University.

Programs

The Department of Apparel, Textiles, and Interior Design offers a master of science degree in apparel and textiles. The department also participates in the College of Human

Ecology Ph.D. program, offering an emphasis in apparel and textiles. Graduate study is structured to prepare students for professional employment in careers emphasizing research and scholarly contributions. A program of study is individually planned to meet the student's specific needs and career objectives. Areas of specialization include:

- Consumer behavior/marketing in apparel and textiles
- Functional apparel design
- Textile science
- Thermal comfort of apparel and textiles

Objectives
The objective of the graduate programs in apparel and textiles is to prepare students for positions in education, industry, and public service that require expertise in apparel and textiles. Students develop this expertise through course work, research experience, consultation with graduate faculty members, and internships.

Facilities and equipment
Apparel and textiles facilities in Justin Hall include separate laboratories for teaching beginning textiles and advanced textiles, accelerated weathering and laundry testing, conditioning textiles for physical analysis, microscopy and light scattering, spectroscopy, textile conservation, storage of historic textiles and costumes, and outdoor exposure of textiles. These laboratories contain the testing equipment necessary to conduct most of the major ASTM and AATCC textile tests. Two large apparel design laboratories containing both industrial and home sewing equipment. In addition, the college also has a microcomputer laboratory for students which includes computer graphics programs capable of producing garment patterns and illustrations.

Other facilities available on campus include eight climate-controlled chambers and extraordinary thermal measuring devices (e.g., manikins, sweating hot plate) housed in the Institute for Environmental Research, a scanning electron microscope, neutron activation analysis, nuclear magnetic resonance, x-ray florescence and x-ray diffraction equipment.

Master's degree in apparel and textiles

The Department of Apparel, Textiles, and Interior Design offers a master's degree program with emphasis in apparel and textiles. The master's program offers two options: (1) 30 credit hours including 6–8 hours of thesis research and an oral examination, (2) 33 credit hours of course work and a written examination. The student and his or her supervisory committee plan the program of study together considering the student's interests and career goals. The program is very flexible.

Ph.D. in human ecology: apparel and textiles

The department also participates in the College of Human Ecology Ph.D. program, offering an emphasis in apparel and textiles. Course requirements for the Ph.D. program specify a minimum of 30 hours of course work (12 hours of core courses, a dissertation proposal seminar and other course work in major area); a minimum of 30 hours of dissertation research; and a minimum of 15–30 hours of supporting courses (a sequence of statistics courses, a research methods course, plus other supporting courses). A program of study will be individually planned to meet the specific needs and career goals of the student. Preliminary written and oral examinations and an oral defense of the dissertation also are required. See Human Ecology in this catalog for more information on the Ph.D. program.

Admission and application

Master's degree
Admission to the Graduate School requires a bachelor's degree from an accredited institution. Regular admission requires a minimum grade point average of 3.0 on a 4.0 scale for the junior and senior years of undergraduate study. The conditions of admission are based on recommendations by the department's graduate faculty to the dean of the Graduate School, who makes the final decision for admission. All required application materials should be sent to the Department of Apparel, Textiles, and Interior Design.

Ph.D. degree
Prospective students applying for admission to the Ph.D. program are encouraged to complete their application materials by February 1 for admission for the following fall semester. International students should have their application files completed at least one month before the Graduate School deadlines for processing, which are: June 1 for fall semester; November 1 for spring semester; and March 1 for summer School.

A personal interview with a faculty member in the intended field of specialization is recommended, and in some cases, it may be required by faculty in the specialization.

A complete application includes a Graduate School application, one official transcript of all previous higher education credits and grades, a statement of objectives designating the area of specialization and emphasizing evidence of course work and/or professional experience appropriate for preparation, and at least three letters of reference.

In addition to the above credentials, international students must submit a TOEFL score, unless the student has a degree within the past two years from a college where English is the instructional language and a statement of financial support.

The application materials for the Ph.D. should be sent to Pat Haas, Ph.D. in Human Ecology program, Dean's Office, College of Human Ecology, Kansas State University, 119 Justin Hall, Manhattan, KS 66506.

For applicants with master's degrees, a minimum graduate GPA of 3.5 on a 4.0 scale is required. In exceptional cases, admission into the Ph.D. program without a completed master's degree may be approved. The minimum undergraduate GPA for such applicants is 3.5 on a 4.0 scale. International students must score 213 or higher on the computer based TOEFL (550 on the paper based) for admission to K-State. Conditions of admission are based on recommendations by the graduate faculty members in the area of specialization who consider all relevant information in making admission decisions.

Normally, a student who enters the Ph.D. program with a completed master's degree will spend at least two years in residence. The Graduate School's minimum residency requirements specify at least a year in residence at Kansas State University, which can be met by enrolling for 24 semester hours of course work (excluding dissertation hours) during 12 months of continuous enrollment. Graduate assistants must enroll in a minimum of 6 credit hours during a regular semester. Students appointed to teaching or research positions or assistantships in the College of Human Ecology are given credit for 6 additional hours of residency for each of two semesters during which they are enrolled.

Assistantships/scholarships

Financial aid is available through teaching and research assistantships. Graduate students receive a monthly stipend and tuition fee reduction or waivers. Assistantship applications are due February 1 with a decision announced by March 15.

Graduate students may qualify for scholarships awarded by the college of Human Ecology or the Department of Apparel, Textiles, and Interior Design. To apply for a scholarship offered by the college, submit by February 1, a K-State scholarship application to the Office of Student Financial Assistance, Anderson Hall, Kansas State University, Manhattan, KS 66506–1405. Applications are available from the Office of Student of Financial Assistance or the College of Human Ecology Dean's Office. Scholarship recipients must enroll full time (9 or more credit hours) during the semester for which the award is made.

Apparel and textiles courses

Undergraduate and graduate credit in minor field

AT 520. Apparel and Textile Merchandising. (2) II, S. Concepts, practices and procedures of apparel and textile merchandise management, including principles of buying and inventory management; cost control and vendor negotiations. Pr: ACCTG 231; CIS102; MKTIB 400; concurrent enrollment in AT 521.

AT 521. Apparel and Textile Merchandising Lab. (1) II. Computer aided laboratory experiences related to the profitable management and purchase of apparel and textile products. Pr: ACCTG 231; CIS 102; MKTIB 400; concurrent enrollment in AT 520.

AT 536. Apparel and Textile Store Operations. (3) I. Analysis of the elements, processes, and controls involved in operating an apparel and textile business. Pr.: AT 230 and junior or senior standing.

AT 545. Apparel and Textile Industry. (3) I. Analysis of fiber, textile, and apparel production; industry structure; impact of government regulations on production. Pr.: ECON 110.

AT 550. Apparel Design Field Experience. (5) II, S. Preplanned and supervised off-campus work experience in the apparel industry. Pr.: AT 660; junior or senior standing in Apparel Design; 2.5 cumulative GPA; 3.0 GPA in professional course work; consent of instructor.

AT 580. Internship in Textiles. (Var.) I, II, summer. Professional work experience in the fiber-textile-apparel industry, related government agencies, dyestuff/chemical companies, museums, Cooperative Extension Service under faculty supervison. May be repeated for up to 12 credits. Pr.: CT 615 and 680, 2.5 GPA.

Undergraduate and graduate credit

AT 610. Computer-Aided Design of Apparel. (3) I. Overview of computer-aided design as it relates to the apparel industry; introduction and application of computer hardware and software to apparel design, including apparel illustration, pattern design, pattern grading, and pattern marker development by computer. Six hours lab a week. Pr.: AT 400.

AT 620. Textile Yarn and Fabrics. (3) II. Technological, structural, and functional aspects of yarns and fabrics. Pr.: AT 265 and 266.

AT 630. History of Costume. (3) II. Interrelationship of costume and social, cultural, political, and economic environments from antiquity to present. Pr.: 3–6 hours in humanities.

AT 635. Issues and Ethics in Apparel and Textile Marketing. (2) II. Examination of the current issues and ethical concerns facing the apparel and textile industries. Emphasis on decision making, strategic planning, and integration of course work. Pr.: AT 230; MKTIB 400; AT 520 or concurrent enrollment.

AT 642. Textiles Fibers. (3) I, in alternate years. Study of the fundamental concepts associated with fiber chemistry; fiber microstructure and macrostructure; fiber mechanical, physical and chemical properties and newer technologies in fiber science. Pr.: AT 265, AT 266, and CHM 350.

AT 645. Import/Export Strategy in the Apparel and Textile Industries. (3) II. Analysis of the strategic importance of exporting and importing in the marketing strategy of apparel and textile related businesses; introduction to product development and global sourcing issues as they relate to individual business strategy. Pr.: AT 545, MKTIB 400.

AT 650. Apparel and Textiles Study Tour. (1–2) I,II, S. Supervised off-campus tour of facilities where textile products are designed, manufactured, tested, marketed, exhibited, and/or conserved. Pr.: AT 265 and AT 266 and 6 hours in apparel and textiles.

AT 660. Apparel Design and Production IV. (4) I. Creation and analysis of apparel for different manufacturing categories; study and application of computer-aided design to apparel production; advanced pattern development; advanced apparel grading. Two hours lec. and six hours lab a week. Pr.: AT 610; AT 400.

AT 680. Physical Analysis of Textiles. (4) I. Theory, principles, and procedures in evaluating the physical properties of textile fibers, yarns, fabrics, and products for apparel, interior furnishings, and industrial uses. Three hours lec. and three hours lab a week. Pr.: AT 265 and 266.

AT 690. Apparel Design and Production V. (4) I. Creation and analysis of apparel for different manufacturing categories; portfolio development; job search strategies. Two hours lec. and six hours lab a week. Pr.: AT 660.

AT 715. Advanced Apparel Design. (3) II. Application of pattern drafting, manipulation, and/or draping with emphasis on the development of patterns for original designs. Six hours lab a week. Pr.: AT 660, AT 610.

AT 720. Functional Apparel Design. (3) II. The design process; criteria for design and evaluation of apparel systems for protection from various environmental hazards; design and evaluation of apparel systems with emphasis on functional aspects. Two hours lec. and two hours rec. Pr.: AT 265 and AT 266.

AT 725. Strategic Planning in the Apparel and Textile Industry. (3) II. Theoretical and applied analysis of apparel and textile industry market strategies. Examination of normative strategic planning models and effectiveness of market orientation in the apparel and textile industry; discussion of current external environmental and industry trends influencing strategy decisions by firms in the apparel distribution channel. Pr.: MKTIB 400, AT 545.

AT 730. Textile Conservation. (3) I, S, alternate years. Scientific theories of textile conservation related to fiber degradation, storage, repair, cleaning, and exhibition of historic items. Laboratory experience in solving conservation problems related to historic textiles. Two hours lec., two hours lab a week. Pr.: AT 630 or IDH 680.

AT 746. Textile Dyeing and Printing. (4) II, alternate years. In-depth study of color systems, colorimetry, physical and chemical properties of dyes, methods of dye-fiber association, and industrial dyeing and printing methods. Two hours lec. and six hours lab a week. Pr.: AT 642.

AT 747. Textile Finishes. (3) II, alternate years. Theory, application, evaluation, and identification of finishes and auxiliary products which are applied to textile fibers, yarns, and fabrics. Two hours lec. and three hours lab a week. Pr.: AT 642.

AT 765. Chemical and Optical Analysis of Textiles. (3) I, alternate years. Application of organic chemistry and optical analysis to fibers, dyes, and finishes. Two hours lec. and three hours lab a week. Pr.: AT 642.

AT 775. Experimental Textiles. (Var.) On sufficient demand. Individual investigation into textile research. Pr.: AT 642 or AT 680.

Graduate credit

AT 820. Textiles and the Thermal Environment. (3) II, alternate years. Fundamentals of textile insulation, its measurement and prediction for different types of textile products; the study and measurement of human response to thermal environmental factors and textile insulation. Pr.: AT 265 and 266; and STAT 702 or 703.

AT 825. Advanced Study in History of Apparel and Textiles. (3) I, alternate years. Advanced work in various aspects of the history of apparel and textile products and their relationship to the social, cultural, political, and technical environment. Explores the main currents in historical research in apparel and textiles. Pr.: AT 630 or IDH 680.

AT 835. Textile and Apparel Economics. (3) I. Analysis of the fiber, textile, and apparel industries. Issues in the production and distribution of textile products with emphasis on international trade and government involvement. Pr.: ECON 120, and six hours apparel and textiles at 400 level or above.

AT 841. Polymer Science. (3) I, in alternate years. Theory, application, and methods of structural analysis with emphasis on synthetic polymers. Pr.: CHM 350 or CHM 531 and graduate standing.

AT 845. Consumers in the Apparel and Textile Market. (3) I. Analysis of psychological, sociological, and cultural theories of consumers' apparel behavior and an examination of factors influencing consumers' decision-making process. Pr.: AT 330 or consent of instructor.

AT 850. Research Methods in Apparel and Textiles. (3) II. Review of current literature with implications for future research; analysis of research methodologies. Pr.: A graduate-level course in statistics and 6 hours in AT.

AT 855. Readings in Apparel and Textiles. (1–2) I, II, S. Directed reading and study of selected topics in apparel and textiles. Pr.: AT 850.

AT 860. Contemporary Topics in Apparel and Textiles. (2–3) I, alternate S. Analysis of social and environmental factors related to apparel and textiles. May be taken more than one semester with consent of student's advisory committee. Pr.: Eight hours of credit basic to field.

AT 865. Historic Costume and Textile Collection Management. (3) II, in alternate years. Collection policy development, registration, and cataloging of historic costume and textile collections, physical processing of objects, and usage of collections. Two hours lec. and two hours lab a week. Pr.: CT 630 or IDH 680.

AT 870. Problems in Apparel and Textiles. (Var.) I, II, S. Independent study in apparel design, textiles, history of costume, or apparel and textile marketing. Pr.: Six hours credit basic to the field.

AT 875. Practicum in Apparel and Textiles. (Var.) I, II, S. Preplanned and supervised off-campus experience in business, industry, museums, government agencies, or the cooperative extension service. Pr.: Twelve hours in the field.

AT 898. Master's Report. (1 or 2) I, II, S. Written report to meet the requirements for the degree master of science. Subject chosen in consultation with major instructor. Pr.: Consent of department head.

AT 899. Master's Thesis Research in Apparel and Textiles. (Var.) I, II, S. Research in apparel or textiles for the master's thesis. Pr.: Consent of major professor.

AT 980. Professional Development Seminar. (3) II, alternate years. Current research, topics, and issues relevant to professionals in clothing and textiles. Pr.: AT 850.

AT 990. Dissertation Proposal Seminar. (1) I, II. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, three hours of research design or methods, and consent of major professor.

AT 999. Dissertation Research in Apparel and Textiles. (Var.) I, II, S. Research in apparel or textiles for the doctoral dissertation. Pr.: Consent of major professor.

Interior design and housing courses

Undergraduate and graduate credit in minor field

IDH 500. Intermediate Interior Design Studio. (3) S. Problem-solving in interior design. May substitute for Interior Design studio IDH 445, IDH 545, or IDH 645. Students should plan to substitute this course for the next level studio in sequence. Pr.: IDH 315, IDH 345, IDH 435, and admitted to the Interior Design major.

IDH 530. Interior Design Practices and Procedures. (3) II. Ethics, business procedures, and professional development; contract services and administration; and preparation for job market entry as applied to the practice of interior design. Three hours lec. a week. Pr.: IDH 445 or conc. enrollment.

IDH 545. Senior Interior Design Studio I. (3) I. Designing solutions to environmental and behavioral problems related to non-residential interiors. Planning, space analysis, and coordination of furnishings, fixtures, materials, and equipment. Six hours studio per week. Pr.: IDH 530.

IDH 599. Interior Design and Housing Internship. (3–4) I, II, S. Supervised off-campus professional experience in appropriate design-related firms, government agencies, or the housing industry. Pr.: Senior standing; 2.2 cumulative GPA and 2.5 GPA in professional area; IDH 445, and consent of internship coordinator.

Undergraduate and graduate credit

IDH 600. International Studies: British Cultural Survey. (3) Intersession. A study tour to acquaint the student of the rich artistic and cultural locations in London, and other examples of architecture and town planning such as Georgian Bath. Lectures and tours target important design and furniture collections. England's varied examples of religious buildings compete for attention in this great center of art and architecture. Pr.: HIST 101 or 102, or ART 195 or 196.

IDH 630. Household Equipment Theory. (3) I. Analytical study of appliance design, performance, and evaluation concepts for application in consumer decision-making. Not open to students with credit in IDH 440. Six hours rec. and lab a week. Pr.: Four hours lab science course.

IDH 645. Senior Interior Design Studio II. (3) II. Advanced design solutions to environmental and behavioral problems related to non-residential interiors. Planning, space analysis, and coordination of furnishings, fixtures, and materials, and equipment. Six hours studio per week. Pr.: IDH 530.

IDH 650. Advanced Design and Behavior in the Interior Environment. (3) I. The design of interior environments explored in an ecological, behavioral, and cultural context. Three hours lec. per week. Pr.: IDH 345 or consent of instructor.

IDH 651. Designing Supportive Environments. (3) II. Analysis of the age- and ability-related needs and challenges faced by children, older adults, and persons with disabilities. Team approaches to providing living and work environments that accommodate both universal and special human needs. Two hours lec. two hours studio/rec. Pr.: IDH 410 and IDH 445, or consent of instructor.

IDH 660. Kitchen and Utility Area Planning. (3) II. Functional and research basis for planning and arranging based on activity analysis, equipment, materials, lighting, and ventilation. Two hours lec. and two hours lab a week. Pr.: HDFS 460 or IDH 345 or ARCH 261.

IDH 680. Historic Fabric Design. (3) I. Interrelationships of fabric design and social, cultural, political, economic, and geographical environments from prehistoric times to present. Pr.: HIST 101; and AT 260; or AT 265 and AT 266.

IDH 710. Housing and Facilities Management Processes/Applications. (3) II. Application of theories, principles, and practices used in managing physical facilities and the residents or workers they house. Issues and problems encountered by professional managers in providing quality living or working environments within cost-effective operations. Three hours lec. per week. Pr.: IDH 410, MANGT 420 or 720, and consent of instructor.

IDH 725. Community Housing Assessment. (3) I. Developing local and regional housing needs assessments and strategies to meet the challenges faced by lower-income people and racial and ethnic minorities. Analysis of current housing and community development programs and public-private partnerships for affordable housing. Three hour seminar. Pr.: IDH 410 or instructor consent.

IDH 740. Advanced Household Equipment. (3) II. Application of basic electrical, optical, refrigeration, heat transfer, psychometric, and detergent chemistry principles to the study of household equipment, with emphasis on techniques and instrumentation for consumer testing. Six hours rec. and lab a week. Pr.: IDH 440, PHYS 115, and senior or graduate standing.

IDH 760. Historic Preservation and Restoration of Interiors. (3) I. Principles, guidelines, and qualities of preservation and restoration of interiors. Research and application. Pr.: IDH 320 and 360; or AT 630 and AT 631; or ENVD 250 and 251.

Graduate credit

IDH 800. Interior Design Studio VI. (3) I, II, S. Advanced studio experiences in residential interior environments. May be repeated with a maximum of 6 hours applied toward a graduate degree. Pr.: IDH 545 or 645; and IDH 651 or conc. enrollment, or IDH 760 or conc. enrollment.

IDH 820. Readings in Interior Design and Housing. (2) I, II, S. Supervised independent study of current issues in interior design or housing. Pr.: IDH 410 or IDH 445.

IDH 825. Social Effects of the Housing Environment. (3) II. A critical analysis of the literature on the social influences on the family and the individual attributable to the nature of the housing and neighborhood environment. Alternative physical determinist and socio-cultural interpretations are developed. Pr.: IDH 410 and STAT 702 or STAT 703.

IDH 840. Experimental Methods in Household Equipment. (2) I, in alternate years. Philosophy of household equipment evaluation and experimentation; emphasis upon instrumentation, selection of variables, and data analysis. Pr.: A course in statistics and IDH 740.

IDH 870. Problems in Interior Design and Housing. (Var.) I, II, S. Independent study in interior design and housing. Pr.: Six hours of credit basic to field.

IDH 875. Practicum in Interior Design and Housing. (Var.) I, II, S. Preplanned and supervised off-campus experience in business, industry, museums, government agencies, or the cooperative extension service. Pr.: Twelve hours in the field.

IDH 899. Research in Interior Design and Housing. (Var.) I, II. Research which may form the basis for the master's thesis. Pr.: AT 850; graduate standing.

IDH 920. Housing Economics. (3) II. Analysis of economic research related to consumer and government decisions about housing, including financing, regulation, subsidy programs, energy conservation, and choice of characteristics. Pr.: ECON 520, course in statistics, and two courses in housing, urban economics, or planning.

For more information

For additional information and application materials please contact:
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Architectural Engineering

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Charles R. Bissey, M.S., Kansas State University.
Charles L. Burton, M.S., University of Kansas.
Richard B. Hayter, Ph.D., Kansas State University.
Steve Moser, M.S., Colorado University.
Tim Tredway, M.S., University of Kansas.

The department

The Department of Architectural Engineering and Construction Science offers courses of study leading to the master of science degree. The department has ABET accreditation (Accreditation Board for Engineering and Technology, Inc.).

The department consists of 14 full-time faculty members. The research interests of the staff cover major areas of modern building systems design: lighting/electrical, heating and air conditioning, plumbing, structural analysis, cold-formed steel design, energy analysis, energy auditing, acceptance testing, and indoor air quality. Several faculty members direct research and utilize this research in the enhancement of both graduate and undergraduate teaching. The objective of the program is to provide advanced studies in engineering, analysis and design of all the disciplines in building systems. The department has excellent facilities, which include design drafting rooms, classrooms, faculty offices, an outstanding electrical and lighting laboratory for research and teaching, and access to the most recent computer technology.

Master of science degree

A. The minimum requirement for course work is 30 semester hours of graduate credit with options as specified in this catalog and required undergraduate work that is subject to the approval of the department. Depending on the selected degree options a student has a significant range of elective courses from which to choose with the approval of the student's graduate committee. The program is structured to permit the student, by diligent work, to complete the M.S. requirement in one calendar year. Substitution for one or more of the specified courses may be made if the department judges that equivalent study has been successfully completed.

B. A combination B.S. and M.S. degree program is offered to undergraduates in architectural engineering at Kansas State University. This professional M.S. degree challenges top students in architectural engineering with research experiences, faculty mentoring and advanced course work. The program allows the student an opportunity to specialize in an emphasis area of systems engineering applied to building design and analysis. The combined B.S./M.S. program builds on the broad-base, generalist emphasis of the B.S. ARE program and allows top students to specialize with additional research experiences, faculty mentoring and advanced course work. Students and faculty are matched by interest and capability to determine an emphasis area, program of study, and graduate committee. Current emphasis areas include: mechanical systems, electrical power distribution, illumination, and building structural design.

This program allows architectural engineering students meeting the following requirements to be admitted to the graduate school:

1. Completed 135 or more credit hours of the architectural engineering curriculum.

2. Obtained a cumulative grade point average of 3.25 or higher in the architectural engineering curriculum and in the two years prior to entry into the combined MS/BS program.

3. Accepted by the Department of Architectural Engineering graduate faculty.

4. Met all entrance requirements of the graduate school with the exception of completing a B.S. degree (1.B. of the graduate handbook).

This program allows accepted students to reduce their undergraduate program by 15 credit hours and replace these hours with 15 credits towards the requirements of the M.S. degree. All of the requirements of the graduate school will be met or exceeded. The undergraduate program will be reduced by 3 credits of free electives and 12 credits of complementary electives.

For more information about the Ph.D. program, see the Engineering section of this catalog.

Architectural engineering courses

Undergraduate and graduate credit in minor field

ARE 523. Timber Structures. (2) I, II. Determination of loads, including wind and seismic. Includes discussion on load probabilities. Analysis and design of timber structures using solid and laminated materials. Two hours rec. a week. Pr.: CE 537.

ARE 524. Theory of Structures II. (3) I, II. Analysis and design of steel structures following the AISC/LRFD specifications for buildings. Includes background on the probability-based LRFD method. Three hours rec. a week. Pr.: CE 537.

ARE 528. Theory of Structures III. (3) I, II. Design of reinforced concrete building frames; floorings, columns and floor systems, attention being given to costs and economical design. Three hours rec. a week. Pr.: CE 537.

ARE 532. Lighting Systems Design. (2) I, II. Study of human needs in lighting, lighting sources, lighting systems design and application. Two hours rec. a week. Pr.: PHYS 114 or 214.

ARE 533. Building Electrical Systems. (3) I, II. Study of basic design of building electrical systems including circuit design, power distribution and service equipment. Three hours rec. a week. Pr.: EECE 519.

ARE 534. Thermal Systems. (3) I, II. Study of man's physiological needs, principles of heat transfer, principles of building thermal balance, comfort systems, and space-use relationships involving heating, ventilating, and cooling as integral parts of architectural engineering design. Three hours a week. Pr.: PHYS 214 and CNS 321.

ARE 536. Plumbing/Fire Protection Systems Design. (3) I, II. Sewage disposal systems, building plumbing and fire protection systems, space relationships, equipment requirements as related to architectural design, structural systems, construction materials, and techniques. Three hours rec. a week. Pr.: PHYS 213 and CNS 321.

ARE 537. Acoustic Systems. (2) I, II. Hearing and the ear, sound generation, acoustical correction, noise reduction, and sound transmission all as integral parts of architectural design. Two hours rec. a week. Pr.: PHYS 113 or 213.

ARE 539. Architectural Engineering Management. (3) I, II. General business and management procedures. Drawings, specifications, and conceptual estimating. Contracts, bonds, liability, arbitration, and insurance. Project financing. Three hours rec. a week. Pr.: ME 560. Must be taken concurrent with ARE 690.

ARE 590. Integrated Building System Design. (3) I, II. Methods for integration and coordination of structural, mechanical, electrical and lighting systems in the building architectural design process. Two hours rec., three hours lab per week. Pr.: ARE 411. Must be taken the semester immediately prior to ARE 690, Senior Project.

ARE 620. Problems in Architectural Engineering. (Var.) I, II, S. A study of specific design problems under the direct supervision of a member of the architectural engineering faculty. Pr.: Approval of the department head.

ARE 640. Building Mechanical Systems. (3) I, II. Study of heat gain using computers, pump laws, fan laws, various types of HVAC air systems, chilled water systems, heat pump systems, refrigeration, introduction to mechanical system controls. Two hours rec. and two hours lab a week. Pr.: ARE 534 and ME 513.

ARE 690. Senior Project. (3) I, II. Student working individually with laboratory support will prepare and present a project of appropriate scope and complexity with emphasis on structural, mechanical, acoustical, electrical and lighting requirements. Nine hours lab a week. Pr.: ARE 523, 524, 528, 532, 533, 534, 536, 537, 590, and 640. Must be taken concurrently with ARE 539, Architectural Engineering Management.

Undergraduate and graduate credit

ARE 710. Building Energy Analysis. (V) I. Study of building energy consumption and current modeling techniques to analyze overall energy usage including: auditing of existing buildings, economic evaluation and energy efficient system selection for new construction. Two or three rec. hours a week. Pr.: ARE 534.

ARE 720. Topics in Architectural Engineering. (V) I, II, S. A study of specific design problems in architectural engineering. Pr. or conc.: ARE 590.

ARE 724. Advanced Sanitation Systems. (3) I. Water quality and treatment, pressure control, and hydraulics in domestic water and waste systems. Three hours rec. a week. Pr.: ARE 536 or CNS 536.

ARE 731. Advanced Lighting Design. (3) II. Lighting modeling and analysis used in lighting design practice and computer assisted lighting analysis. Two hours rec. and two hours lab a week. Pr.: ARE 532.

ARE 734. Building Thermal Systems Design. (3) II. Design and specifications of selected thermal and mechanical systems for structures. The course uses all the modern techniques of thermal/mechanical system design for buildings. Students are required to develop term research design projects. Two hours rec. and three hours lab a week. Pr.: ARE 640.

ARE 735. Electrical Systems Design. (3) I. Complete design and specifications of electrical systems for a selected structure. The course uses the National Electrical Code in conjunction with all the modern techniques of electrical systems design for buildings. Two hours rec. and three hours lab a week. Pr.: ARE 533.

ARE 740. Environmental Control Systems in Buildings. (3) II. Electric, electronic, and pneumatic control systems to optimize energy usage and environmental comfort in buildings. Three hours rec. a week. Pr.: ARE 640 and EECE 519.

ARE 741. Building Communication Systems. (3) I. Detailed design and analysis of special electrical systems for buildings including fire alarm, and communication systems. Three hours rec. a week. Pr.: ARE 533.

ARE 760. Masonry Structural Design. (3) I. Introduction to masonry materials, specifications, testing and construction methods. The design of unreinforced and reinforced masonry structures according to applicable building codes. Three hours rec. a week. Pr.: ARE 528 or equivalent first course in reinforced concrete design.

ARE 780. Theory of Structures IV. (3) II. Continuation of Theory II and III, with special emphasis on the complete problem of the structure as a whole. Three hours a week. Pr.: CE 537 and 523, 524, and 528.

ARE 890. Problems in Architectural Engineering. (Var.) I, II, S. A study of a specific problem under the direct supervision of a member of the architectural engineering faculty. Pr.: Approval of Major Professor. May be repeated.

ARE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

ARE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

Construction science courses

Undergraduate and graduate credit in minor field

CNS 510. Computer Applications in Construction Science. (V) I, II. On sufficient demand. Applications of specialized computer techniques to the solution of problems in construction science. By appointment. Pr.: CNS 210.

CNS 522. Theory of Structures. (3) I, II. The elastic analysis of determinate and indeterminate structures. Emphasis on equilibrium equations, shear and moment diagrams and solving forces in trusses. Includes solutions of indeterminate structures by moment distribution and matrix stiffness method with microcomputer applications. Three hours rec. a week. Pr.: CE 331.

CNS 523. Timber Construction. (2) I, II. Principles of design, fabrication, and erection of timber structures including both solid and laminated materials. Two hours rec. a week. Pr.: CNS 522.

CNS 524. Steel Construction. (3) I, II. Principles of design, fabrication, and erection of structural steel in conformance with codes. Two hours lec. and three hours lab a week. Pr.: CNS 522.

CNS 528. Concrete and Masonry Construction. (3) I, II. Principles of design, fabrication, and erection of concrete and masonry structures. Two hours lec. and three hours lab a week. Pr.: CNS 522.

CNS 534. Heating and Air Conditioning. (3) I, II. Principles of designing, applying, installing, and estimating heating and air conditioning systems for buildings. Three hours rec. a week. Pr.: PHYS 113 and CNS 321.

CNS 535. Electrical Service and Installation. (3) I, II. Basic design and construction of building electrical, lighting, and distribution systems with emphasis on the National Electrical Code and installation. Three hours rec. a week. Pr.: PHYS 114 and CNS 321.

CNS 536. Water Supply and Plumbing. (3) I, II. Principles and practices of plumbing and fire protection systems in buildings including code requirements and estimating. Three hours rec. a week. Pr.: PHYS 113 and CNS 321.

CNS 540. Construction Methods and Equipment. (3) I, II. Operations, costs, productivity of construction equipment. Investments/life cycle costing of the equipment. Equipment selection criteria and analysis. Construction methods. Three hours rec. a week. Pr.: CNS 321, 330, and 522.

CNS 544. Problems in Construction Science. (Var.) I, II, S. A study of specific design problems under the direct supervision of a member of the construction science faculty. Pr.: Junior standing.

CNS 545. Heavy Construction Methods. (3) I. Principles of asphalt, asphalt and concrete paving operations, concrete batch plant operations, heavy construction equipment and applications. Three hours recitation a week. Pr.: CNS 325, 540.

CNS 634. Building Systems Installation and Commissioning. (3) I, on sufficient demand. Principles and methods for proper installation, commissioning and maintaining of efficient performance of mechanical, plumbing, fire protection, electrical, and lighting systems in building. Three hours rec. a week. Pr.: CNS 534, 535, and 536.

CNS 640. Construction Operations. (3) I, II. Shop drawing and submittal processes, field and office practices, change orders, construction safety standards and practice, pre-construction planning, expediting, short-interval planning. Two hours rec. and three hours lab a week. Pr.: CNS 325 and 540. Conc.: CNS 641.

CNS 641. Construction Estimating. (3) I, II. Understanding estimating procedures, quantity surveying, specification reviews, pricing of an estimate, market analysis, subcontractor and supplier solicitation, and risk management, following the CSI format. Nine hours lab a week. Pr.: CNS 325 and 540.

CNS 642. Construction Management. (3) I, II. An introduction to the business of construction; study of legal considerations, contract documents, bonds and insurance. Evaluation of the characteristics of the construction firm, organization structure, and financial performance. Three hours rec. a week. Pr.: CNS 540.

CNS 644. **Topics in Construction Management.** (V) I, II. On sufficient demand. Topical material of importance in the management of construction such as marketing, ethics, personnel management, etc. Pr. or conc.: CNS 642.

CNS 645. **Construction Scheduling and Cost Control.** (2) I, II. Construction cost reporting and control. Construction planning, both long-term and short-interval, construction scheduling, monitoring, and controlling. Computer applications. One hour rec. and two hours lab a week. Pr.: CNS 640, 641, and 642.

CNS 650. **Construction Safety.** (2) I, II, on sufficient demand. Introduction to safety and safety programs, workers' compensation, OSHA organization and structure, safety policies and record keeping, safety standards. Emphasis will be on communication and job-site safety management. On-site safety inspections will be required with in class presentation and written reports to be submitted. Two hours rec. a week. Pr.: CNS 642.

CNS 738. **Mechanical and Electrical Estimating.** (2) II. Techniques of mechanical and electrical building systems estimating. Procedure for evaluating relative costs of different systems. Development of computer-aided finite and conceptual estimating techniques. Two three-hour labs per week. Pr.: ARE 534 or CNS 534, ARE 536 or CNS 536, and Pr. or Conc: ARE 533 or CNS 535.

For more information

For additional information and application materials please contact:
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Architecture

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Overview

The master of architecture program is a post-professional program of study requiring a minimum of 30 semester credit hours. The program usually requires two years in residence, and is designed to enable students to pursue specialized study in architecture. The graduate program offers specializations in environment-behavior and place studies, and design theory. These areas of specialized study in the master of architecture program accommodate graduates of professional architecture programs, and in special cases graduates from four-year baccalaureate programs in architecture as well as other disciplines.

Applicants are considered upon the merits of their academic backgrounds and proposed programs of study. Minimum entrance requirements established by the Graduate School include a bachelor's degree from an accredited university and a grade point average of B (3.0) or better in the last two years of undergraduate study.

Our program focuses on research, and therefore does not include the full range of topics required to qualify a student to sit for the examination to become licensed to practice architecture. Since research is the mode of learning at the limits of knowledge, our objective is to develop the capacities needed for independent study and research.

Resources

College of Architecture and Design resources include the Paul Weigel Library, a professionally staffed branch of the university's main facility. It includes over 35,000 bound volumes and approximately 200 periodical subscriptions. Among other facilities supporting instruction and research in the college are the Technical Information Collection, the computer laboratory, the Krider Audio-Visual Learning Resource Center, and an artificial sky. Students in the college enjoy a diverse range of lectures, seminars, exhibits, and guest critics throughout the academic year.

I. Environment-behavior and place studies

Environment-behavior and place studies focus on the behavioral and experiential aspects of person-environment relationships and their implications for environmental design and research. The program examines varying philosophic and methodological approaches to issues in environment-behavior and place experience. Approaches to these issues range from quantitative explanatory styles of research emphasizing pragmatic strategies and solutions to qualitative descriptive styles emphasizing philosophical concerns. Within this framework, students' programs of study and research are individualized to meet particular interests and needs. After completing an introductory core curriculum, students may choose to concentrate on a specific environmental problem or approach, or to work to creatively combine several approaches and issues. Within environment-behavior and place studies, areas of focus can include community and facility design for special populations, experience of place, project planning and programming, or a special focus meeting the particular educational and career goals of the individual student. In consultation with their advisors, students combine elective courses within and outside the college to meet the needs of their specific areas of focus.

Required curriculum

ARCH 720	Environment and Behavior
ARCH 725	Research Methods in Architecture
ARCH 704	Seminar: Building Evaluation
LAR 898	Seminar: Thesis Proposal Preparation
ARCH 899	Thesis
Electives	
Graduate colloquium	

Graduate colloquium

In addition to course work, all students in the environment-behavior and place studies option are required to participate in a graduate colloquium during the spring semester of their second year of graduate study. Each student will present completed or in-progress work, whether their thesis, design project, or a paper, to fellow graduate students and faculty.

Recommended electives

ARCH 680	Development Analysis
ARCH 703	Environmental Aesthetics
ARCH 710	Topics in Architectural Design Methods: Computer Applications
ARCH 715	Theory of Design: Qualitative Approaches to Place, Architecture, and Environmental Experience
ARCH 730	Environment and Aging
ARCH 740	Building-Related Health and Safety
IAR 730	Facility Management
STAT 702	Statistical Methods for Social Sciences

Graduate emphasis in gerontology

There is an increasing demand for design professionals who understand the specialized needs of our rapidly growing population of older adults and can apply their expertise to the design of various housing types, health care and long-term care facilities, neighborhoods, and communities. The graduate emphasis in gerontology, a certificate program that can be completed in conjunction with the master of architecture, provides this specialized interdisciplinary knowledge.

An interdisciplinary certificate program, administered by the Center for Aging, is designed to be taken concurrently with or in addition to a disciplinary graduate degree program. This requires 6 credit hours in addition to the 30 credit hours for the master of architecture, with 12 credit hours applying to both programs.

Project planning and programming
An area of emphasis within the general area of environment-behavior and place studies. Almost all institutional or governmental, and many large commercial, projects involve separate planning/programming phases because of the size and complexity of the projects and the number of organizations involved in approval. These services are provided by specialized consulting firms, programmers employed by the client organization, or architectural firms. Students electing this emphasis complete a written and graphic programming project (6 credits of ARCH 830 Advanced Architectural Design) in place of a thesis and take electives selected in consultation with their advisory committee.

Thesis
Students may undertake an applied or theoretical research-oriented thesis that involves qualitative and/or quantitative approaches. Students may elect a design-oriented thesis that examines a physical design problem in depth from a number of points of view, including but not limited to theoretical, behavioral, economic, social, and cultural issues. Recent theses have addressed issues in design methods, educational environments for children, work environments, residential environments for people with dementia, plaza design, interpretations of home and religious environments.

Non-thesis option
In addition to those students emphasizing project planning and programming, who may write a programming document in place of a thesis, other students may petition the graduate committee of the department with a proposal for a non-thesis option. Proposals include 30 credit hours of course work and a final examination. A rationale explaining why an alternative to writing a thesis is most suitable to the student's goals, and an area of specialized focus must be included. For certain topics, a series of courses complemented by supplemental reading and writing and the creation of work in a format other than that required for a thesis, may be employed.

II. Design theory

The graduate emphasis in design theory enables students to focus on architectural and urban theory and history. Current faculty interests and expertise include architectural theory, the pursuit of architectural theory through design, architectural history, historic preservation, urban history, urban design theory, sustainable architecture, geometry in architecture, pattern language, and vernacular architecture. Courses are offered in some of these areas, and individual study through a thesis is possible in others.

Required curriculum

ARCH 715	Design Theory Seminar
ARCH 725	Research Methods in Architecture
LAR 898	Seminar: Thesis Proposal Preparation
ARCH 899	Thesis
	Theory-history electives
	Electives
	Graduate colloquium

Graduate colloquium
In addition to course work, all students in the design theory option are required to participate in a graduate colloquium during the spring semester of their second year of graduate study. Each student will present completed or in-progress work, whether their thesis topic, design project, or a paper, to fellow graduate students and faculty.

Recommended electives
Students consult with their advisors to select courses that match their educational and research objectives. Appropriate graduate-level theory and history courses will be identified each semester from among current course offerings. It is recommended that international students take one or more courses concerned with American architecture and urbanism. It is also strongly recommended that at least one 3-hour course on contemporary architecture be taken by students in the design theory option. Other electives should be related to the student's overall program of study, to reinforce or complement other courses and the thesis topic. Some of the courses listed below may not be offered in a given year, and additional courses may be recommended.

ARCH 657	Preservation Principles
ARCH 670	History of American Architecture and Allied Design 1
ARCH 671	History of American Architecture and Allied Design 2
ARCH 715	Theory of Design: Topics vary each semester-recent titles include: Sustainable Futures; Middle Eastern Architecture and Urbanism; Layering: The Italian City; Issues in Japanese Contemporary Architecture; Qualitative Approaches to Place, Architecture and Environmental Experience; Historic Building Technology and Preservation; Subject and Form in Architecture; Theories of Urban Design; American Architecture Competition
PLAN 615	Shaping The American City
PLAN 640	Growth Management
PLAN 710	Urban Visual Analysis
PLAN 715	Planning Principles and Process
PLAN 752	Physical Process of Plan Implementation
PLAN 753	Planning Law
PLAN 780	Planning in Developing Areas
PLAN 815	Preservation Planning
PLAN 826	Planning Theory, Ethics, and Practice
	Courses in other departments, including philosophy, anthropology, art, and history, may also be considered.

Thesis
Students in the design theory specialization may undertake an applied or theoretical research-oriented thesis which involves qualitative and/or quantitative approaches. Recent theses have addressed issues in community design such as architectural materiality and sense of place, the order of geometry and the meaning of light in Islamic architecture, and urban interventions and transformations in various parts of the world. Other theses have addressed issues of neighborhood preservation and conservation, colonial models influencing contemporary housing in New Delhi, India, and theoretical explorations of the nature of the city.

Non-thesis option
Students may petition the graduate committee of the department for approval to elect a non-thesis option. Students undertaking a final design project are expected to enroll in at least one semester of design studio prior to beginning the final project. The final examination for such students will be the final review of the design project. For students pursuing a course work-only option, the final exam may take the form of a portfolio of written work reviewed by the advisory committee, or some other agreed upon structure.

Application procedures

In addition to the application form and transcripts required by the Graduate School, the following is required to apply to the master of architecture program:

1. A completed statement of educational and career objectives form
2. Three letters of recommendation from professors or employers.
3. Samples of academic/professional work, including a description of each project, its objectives, and your role and responsibilities. The portfolio of design work should be in a format no larger than 8.5 by 11 inches or A4 paper. Samples of written work are highly recommended. (A stamped self-addressed envelope must be included if the applicant wishes the return of the portfolio to an address within the United States. Portfolios will not be returned to other countries, so high quality photocopies are recommended.)
4. Application fee:
   • U.S. citizens remit a cashier's check or money order for $30 payable to the Department of Architecture.
   • International students remit two cashier's checks or money orders: (1) $30 payable to the Department of Architecture; and (2) $25 payable to the Graduate School. International students may send both checks to the department and we will forward the $25 to the graduate school. Personal checks cannot be accepted.

The required forms are included in the application packet, available upon request from the chair of the graduate committee. To be assured consideration applications for fall should be received by March 1. A limited number of new students may be admitted to begin studies during the spring semester. To be assured consideration for spring, application should be received by October 1.

Additional application requirements for international students
Official report of the TOEFL (Test of English as a Foreign Language) exam score. The Department of Architecture requires a score

of 600 on the paper test (or 250 on the computer test) for admission into the master of architecture program, since English language proficiency is an important factor in the ability of a student to complete the degree. In addition, graduate teaching assistantships require a minimum score of 50 on the TSE (Test of Spoken English). This test should be taken at the same time as the TOEFL.

Financial aid

A limted number of graduate teaching assistantships are available for students with particularly strong qualifications. Appointment as a teaching assistant requires knowledge in the subject matter of the course, human relations skills, and excellence in spoken and written English. Appointment to a GTA is made by the head of the department in which a specific course is taught and does not guarantee successive appointments. Specific instructions and application forms are included in the brochure and are available from the chair of the graduate committee.

Limited scholarship aid may be awarded to one or two incoming graduate students each year. The amount of these scholarships ranges between $500 and $1,000.

Architecture courses

Undergraduate and graduate credit in minor field.

ARCH 514 and ARCH 515. Environmental Systems in Architecture II and III. (3 each) Criteria for selection and application of natural and mechanical environmental control systems in architecture. Focus on the integration of thermal, illumination, sanitary, movement, and acoustical systems with the building fabric and the natural environment. Contemporary and developing approaches are explored.

ARCH 566. Problems in Architectural Design. (Var.) Study of specific design problems under the direct supervision of a member of the architectural faculty.

Undergraduate and graduate credit

ARCH 650. Architectural Programming. (3) I, II. An introductory course surveying the basic philosophies and methodologies for architectural programming; emphasis on the comparative evaluation of different strategies and their integration within the process of design. Pr.: Senior standing or permission of the instructor.

ARCH 656. Preservation Documentation. (3) I, II. Investigation of existing buildings and their settings; documenting design qualities, history, materials, systems, construction techniques, landscape, and physical and functional changes over time, using Historical building Survey Standards. Pr.: Senior standing and proficiency in drafting.

ARCH 657. Preservation Principles. (3) I. Examination of theoretical and practical aspects of preservation; background and current issues; design considerations. Pr.: Senior or permission of instructor.

ARCH 670. History of American Architecture and Allied Design I. (3) I. The history of American architecture, including some aspects of interior architecture, urban planning, landscape architecture, and preservation. This course investigates how the built forms of various colonial settlers in America responded to a new environment and, consequently, how a distinct American culture eventually took shape by the end of the 1800s. Pr.: ENVD 250 and 251 or approval of instructor.

ARCH 671. History of American Architecture and Allied Design II. (3) I. The history of American architecture, including some aspects of interior architecture, urban planning, landscape architecture, and preservation. This course surveys those distinctly American styles of design which originated in the late 1800s and traces their impact on world architecture and how outside influences shaped American design from that time period up to the present. Particular emphasis is placed upon the interplay of formal and functional concerns in architectural design. Pr.: ENVD 250 and 251 or approval of instructor.

ARCH 680. Development Analysis. (3) I, II. An examination of various development characteristics and components and their crucial interactive nature which leads toward success or failure of building and land developments. Development factors investigated include: market analysis, location uses and users, cost/benefits, nonmonetary benefits, financial returns expected and needed, financial incentives for investors, and feedback into the design process. Pr.: Admission to the professional program.

ARCH 703. Environmental Aesthetics. (3) I, II. Problems involving aesthetics in areas related to student's major field. Three hours a week. Pr.: Senior standing.

ARCH 704. Seminar. (Var.) I, II. Environmental systems related to human perception, reaction, and behavior. Pr.: Senior standing.

ARCH 705. Project Programming. (2) I, II. The development of a program for ARCH 707, Architectural Design VIII under direction of a faculty member. Pr.: ARCH 606, ARCH 650, and approval of the faculty committee.

ARCH 710. Topics in Architectural Design Methods. (3) I, II. Intensive review of selected design methodologies, including systematic and computer-based approaches to problem definition and project design; emphasis upon the comparative evaluation of problem-solving strategies within the architectural design process.

ARCH 715. Theory of Design. (3) I, II. Analysis of theories and philosophies in the design professions, including those in related societal and technological fields. Topics vary.

ARCH 720. Environment and Behavior. (3) I, II. An introductory course investigating the relationship between human behavior and the design of the physical environment, identifying those basic psychological and social concepts which influence and are influenced by the built environment.

ARCH 725. Architecture Research Methods. (3) I, II. An introductory course surveying the basic philosophies and methodologies of science and research as they apply to the field of architecture. Special emphasis will be placed on those methods appropriate for investigating human response to the built environment.

ARCH 730. Environment and Aging. (3) I, II. An exploration of the aging process related to those factors in the architecturally designed environment that hinder and facilitate successful adaptation by the aging individual.

ARCH 740. Building-Related Health and Safety. (3) I, II. Multi-disciplinary concepts and applications of building-related health and safety in the design, construction, and operations of residential, commercial, and institutional buildings. Lecture/recitation followed by field work analysis, documentation, and reporting. Pr.: Senior standing or above.

ARCH 746 and 846. Urban Design Studio I and II. (4) I, II. Interdisciplinary design studios involving large scale design; projects with extensive time implementation sequence, responses to socio-economic, cultural, environmental, and technical needs, and implementation strategies. Design methods are applied to selected urban areas of the Midwest.

ARCH 765. Problems in Architecture. (Var.) I, II. A study of specific architectural problems under the direction of a member of the department faculty.

Graduate credit

ARCH 830. Advanced Architectural Design. (Var.) I, II. Studies related to a comprehensive program in architecture. Topics vary.

ARCH 899. Thesis. (Var.) Study in architecture and related fields leading to thesis.

For more information

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Art

Head

Anna Calluori Holcombe

Director of graduate studies

Gary L. Woodward

Graduate faculty

Lynda Andrus, M.F.A., University of Iowa.

Glen Brown, Ph.D., Stanford University.

Kerry Coppin, M.F.A., Rhode Island School of Design.

LouAnn Faris Culley, Ph.D., Stanford University.

Anna Calluori Holcombe, M.F.A., Louisiana State University.

Robert Hower, M.F.A., Cranbrook.

Daniel Hunt, M.F.A., Southern Illinois University.

Yoshiro Ikeda, M.F.A., University of California, Santa Barbara.

Margo Kren, M.F.A., University of Iowa.

Penelope B. Miller, M.R.A.., Ohio State University.

James C. Munce, M.F.A., Indiana University.

Duane P. Noblett, M.F.A., University of Iowa.

Elliot Pujol, M.F.A., Southern Illinois University.

Roger Routson, M.F.A., University of Illinois.

Teresa Tempero Schmidt, M.F.A., Washington State University.

Edward Sturr, Ed.D., Illinois State University.

James P. Swiler, M.F.A., Wichita State University.

Gary L. Woodward, M.F.A., University of Washington.

Emeriti graduate faculty

Angelo C. Garzio, M.F.A., State University of Iowa.

Oscar Vance Larmer, M.F.A., Wichita University.

Judith Love, M.F.A., University of Nebraska.

John William O'Shea, M.F.A., State University of Iowa.

Rex Replogle, M.F.A., University of Kansas.

John L. Vogt, M.F.A., University of Illinois.

Master of fine arts

As established by the College Art Association and accepted by all accredited universities, the master of fine arts degree is the terminal degree in visual arts education and is equivalent to terminal degrees in other fields, such as the Ph.D. or Ed.D. It is a graduate program wherein the emphasis is placed upon the studio practice of art, with the intent of educating students for professional careers as artists and designers or as university teachers of the visual arts.

First and foremost, the profession demands from the recipient of the M.F.A. a certifiable level of technical proficiency and the ability to make art. When work toward the M.F.A. has been concentrated in a particular medium, there should be complete professional mas-

tery of that medium. The generalist, whose preparation has been broader and less specialized, must still meet the critical demands of the profession by convincingly demonstrating expertise and knowledge in a number of areas. In any case, the need for thorough training of the mind, the eye, and the hand is self-evident.

The Department of Art offers a 60-hour graduate program leading to the master of fine arts degree in the fields of painting, drawing, sculpture, ceramics, printmaking, metalsmithing and jewelry, and graphic design and computer imaging. There are 16 full-time graduate faculty members who, in addition to their teaching, are active in exhibiting or publishing. The department has fully equipped workshop facilities and also provides some individual studios for graduate students. Graduate teaching assistantships are available, with the added benefit of 100 percent tuition remission for full-time GTAs.

The university provides a variety of experiences for learning and development through a stimulating series of exhibitions, lectures, theatre presentations, concerts and recitals. Additionally, the art department sponsors its own regular series of visiting lecturers, artists, and critics-including, during the past several years, Garo Antresian, Lynda Benglis, Michael Fried, Lucy Lippard, Robert Morris, Rudy Pozzatti, Miriam Schapiro, Alan Schields, Nathan Goldstein, Ruth Duckworth, Brent Kington, Ken Ferguson, Arline Fisch, and Dale Eldred.

Admission procedures

Upon receipt of a request, the department will supply application blanks and such supplementary information as may be needed to complete the application.

A complete application file must be received in the Department of Art on or before the following deadlines:

Fall admission: the deadline is February 15, preceding the first fall semester the applicant wishes to attend.

Spring admission: the deadline is October 15, preceding the first spring semester the applicant wishes to attend.

The application file must include all of the following. Absence of any one of the requirements will constitute an incomplete application and will not be processed by the graduate studies committee of the department:

1. A completed application form, with an indication of a major area of concentration.

2. Two official copies of transcripts from all colleges or universities attended (transcripts, bearing an official seal, must be sent from each institution directly to the Department of Art).

3. Three letters of recommendation (preferably from former art instructors).

4. A statement of purpose, outlining why the applicant wishes to pursue graduate work in the visual arts.

5. A portfolio of 15 slides of recent work, along with a list of those works by title, date, medium, and size.

6. An international applicant whose native language is not English must submit his/her TOEFL score.

7. The Graduate School requires that a signed statement of financial responsibility accompany the application of an international student.

8. If the applicant wishes to apply for a graduate teaching assistantship, a statement to that effect, along with an explanation of any teaching experience the applicant might have had, should be included.

9. A $25 fee must accompany the completed application.

Entrance requirements

To be admitted as a graduate student in the M.F.A. program, the applicant must have a B.A., B.S., or B.F.A. degree from an accredited institution, adequate undergraduate education in the visual arts, and an undergraduate average of B (3.0) or better in the junior and senior years. The applicant should have at least 60 undergraduate semester credit hours in visual arts, with a minimum of 20 semester hours in the area of concentration.

All international students applying to the M.F.A. program must meet the same level of achievement as U.S. students.

M.F.A. requirements

The graduate course requirements for the M.F.A. of 60 semester credit hours would normally be distributed over six semesters of a three-year program. In any case, the student will be required to spend a minimum of three semesters in the M.F.A. program with one academic year in residency as a full-time student. The 60 semester credits of course work include courses in art history and cognate areas of study. These required credits may not include course work that is required as make-up for undergraduate deficiencies.

Course requirements:
Area of concentration: 35–40 semester credit hours

Supporting studio course: 3–10 semester credit hours

Art history: 9 semester credit hours

Free electives: 11 semester credit hours

Courses outside the area of concentration (supporting and free electives) should be taken from faculty other than the major professor, in order to get as much experience as possible with others on the graduate faculty. Students are also encouraged to take a portion of their free electives outside the art department.

Each student's program of study is subject to the approval of the major professor and the supervisory committee. It is emphasized that this is a committee/departmental option and not a student's option. The thesis requirement for the M.F.A. degree consists of the following:

• The graduate exhibition: a substantial body of original works of art to be exhibited on campus during the final semester of the student's program.

• A written document in which the candidate demonstrates proficiency in conducting research and in analyzing, interpreting, and organizing material, as well as evidencing the ability to communicate perceptions, insights, and conclusions.

• A slide portfolio of the graduate exhibition is required and will be kept by the Department of Art for the record.

• Satisfactory completion of both the visual and written portions of the thesis is required for the awarding of the M.F.A. degree.

• The final oral examination for the M.F.A. degree will be taken when the student has completed the program of study, has hung his or her graduate exhibition, and has delivered a copy of the written document to each member of the supervisory committee.

Applicants with the M.A. degree

Students with an M.A. degree from an accredited institution who wish to apply for the M.F.A. program at Kansas State University should follow the same general application procedures outlined above.

Students who hold an M.A. degree may apply up to 20 hours of that degree toward an M.F.A. The number of hours to be accepted will depend on the relevance of the course work to the M.F.A. After the applicant has been accepted into the M.F.A. program, the director of graduate studies will meet with the graduate studies committee, the proposed major professor and the coordinator of the student's studio area to evaluate the student's transcript and to determine the number of credits which may be applied to the M.F.A. degree.

Art courses

Undergraduate and graduate credit in minor field

ART. 545. Twentieth Century Art History I. (3) I. Origins and development of twentieth century art from 1980 to 1914. Pr.: ART 195 or 196.

ART 550. Twentieth Century Art History II. (3) II. Origins and development of twentieth century art from 1914 to 1950. Pr.: ART 195 or 196.

ART 560. Art for the Exceptional Individual. (3) I, II. Using art concepts and activities to meet the needs of the mentally retarded, physically impaired, emotionally disturbed, or gifted. Three hours lec. Pr.: PSYCH 110. Same as EDCI 560.

ART 565. Ceramics II. (3) I, II. Advanced work on potter's wheel combined with hand-built forms. Consideration of simple kiln design, firing techniques, and procedures using various fuel burning kilns. Six hours lab. May be taken for four semesters. Pr.: ART 265.

ART 570. Painting II. (3) I, II. Continuation of Painting I. Emphasis on a more extensive understanding of concepts about painting which will lead to the development of a wider range of personal experience and expression. Six hours lab. Pr.: ART 245.

ART 575. Graphic Design and Illustration. (3–4) I, II, S. Problems in layout design and illustration for newspapers, magazines, and general advertising. Six hours lab. May be taken for four semesters. Final semester will include a portfolio project. Pr.: ART 205.

ART 590. Studies in Art Therapy. (3) I, II, S. Supervised studies in research relating to the art therapy profession, its current developments, and goals. Pr.: ART 560 or junior standing in a program that emphasizes work with special population groups and consent of instructor.

ART 595. Independent Study in Art Therapy. (1–5) I, II, S. This course offers students who have fulfilled the full sequence of art therapy course work an opportunity for individual advanced study. Area of research to be selected by the student under the advisement of the instructor. Pr.: ART 560, 590 and consent of instructor.

ART 601. Graphic Desigh History/Theory/Criticism. (3) I. II. Study of significant works from late nineteenth century to the present to provide understanding of the development and character of graphic design, artists, and designers. Three hours lecture.

ART 602. Twentieth Century Art History III. (3) I, II, S. Art movements beginning with abstract expressions and continuing through pop, op, minimal, and conceptual art movements up to 1980. Pr.: ART 195 or 196.

ART 603. Twentieth Century Art History IV. (3) I, II, S. The art movements of the 1980s beginning with photorealism and continuing through pattern and decoration, new image art, neo-expressionisms, and neo-abstraction. Pr.: ART 195 or 196.

ART 604. Greek Art History. (3) I, II. The art of classical Greece, from its Aegean origins through the Hellenistic period. Pr.: ART 195 or 196.

ART 612. Renaissance Art History. (3) I, II. Renaissance art of northern and southern Europe in the fifteenth and sixteenth centuries, with a brief discussion of its fourteenth century origins. Pr.: ART 195 or ART 196.

ART 622. Baroque Art History. (3) I, II. The development of the baroque period in northern and southern Europe, from its beginnings in the early seventeenth century to the rococo style of the eighteenth century. Pr.: ART 195 or 196.

ART 630. Foreign Studies in Studio Art. (1–6) I, II, S. Participation in studio art study abroad. Pr.: 3 credit hours of studio art and consent of instructor.

ART 632. The Development of American Art. (3) I, II. American art from the Colonial period to the beginnings of abstract expressionism in the early 1940s, with major emphasis on the late nineteenth and early twentieth century developments. Pr.: ART 195 or 196.

ART 634. History of Modern Sculpture. (3) I, II. Directions in sculpture since the time of Rodin. Pr.: ART 195 or 196.

ART 642. Nineteenth Century Art History. (3) I, II. Painting, sculpture, and architecture of the late eighteenth and nineteenth centuries, with emphasis on the art of France. Pr.: ART 195 or 196.

ART 654. Women in Art. (3) I, II. The work of women artists from early Middle Ages to the twentieth century, with emphasis on the contemporary period. Pr.: ART 195 or 196.

ART 662. Southwestern Indian Arts and Culture. (3) I, II. The development of southwestern Indian silversmithing, weaving, pottery, basketry, and painting from the prehistoric period through the twentieth century. Pr.: ART 195 or 196.

Undergraduate and graduate credit

ART 600. Advanced Drawing. (1–5. Credits over 3 hours must be approved by the instructor.) I, II. Upper-level drawing, development, and personal motivation. Lectures and problems directed toward an understanding of the historical development of drawing as well as investigations of contemporary studies. May be taken for four semesters. Pr.: ART 225, 240.

ART 610. Figure Drawing II. (3) I, II. Continuation of Figure Drawing I, with emphasis on individual expression. Six hours lab. May be taken for four semesters. Pr.: ART 225.

ART 615. Figure Painting. (3) I, II. Painting from the human figure with oil and plastic media. Six hours lab. May be taken for two semesters. Pr.: ART 245, 610.

ART 620. Water Media II. (3) I, II. Painting with emphasis on individual expression in water based media: acrylic, watercolor, gouache. Six hours lab. Pr.: ART 220.

ART 623. Advanced Concepts in Computer Art and Design. (3) I, II, S. Advanced level studio exploration of computers as a tool/medium for art disciplines. Two hours lec., four hours lab. a week. Pr.: ART 200, 400, and instructor permission.

ART 625. Independent Study—Art Education. (1–5) I, II, S. Work offered in art education after competency has been achieved. Personal development is emphasized. Pr.: Full sequence of courses related to art education subject matter.

ART 635. Printmaking II. (3) I, II. Advanced work in blockprints, serigraphy, lithography, and intaglio. Six hours lab. May be taken for four semesters. Pr.: ART 235.

ART 645. Sculpture II. (3) I, II. Emphasis on artistic development through exploratory experiences in the various media. Advanced wood working processes, mold making, foundry techniques and welding processes. Six hour lab. May be taken for four semesters. Pr: ART 230.

ART 650. Advanced Painting. (3–6) I, II. Emphasis on individual directions in painting to attain personal expression and competency. Primarily for undergraduate painting majors. May be taken for four semesters. Pr.: ART 220, 245, 570 or 620.

ART 655. Metalsmithing Techniques. (3) I, II. Surface embellishment, container construction of various techniques, linkage, and mechanical problems will be explored in addition to stone setting. Nine hours lab. May be taken for three semesters. Pr.: ART 270.

ART 660. Sculpture III. (1–5) I, II. Continuation of Sculpture II. Further exploration of media and technique, emphasizing the development of individual direction and expression. Primarily for undergraduate sculpture majors. May be taken for four semesters. Pr.: ART 645.

ART 665. Ceramics III. (1–5) I, II. Individual exploration and further development of ceramic design and glaze technology; continuation of kiln design and construction. Six hours lab. May be taken for three semesters. Pr.: ART 565.

ART 675. History of Ceramics. (3) I, II. History and development of ceramics; study of the use of pottery and other aspects of ceramics from earliest known records to present day. Use of slides and other visual materials. Pr.: ART 195 or 196.

ART 680. Metals Workshop. (1–5) I, II. A number of metalsmithing techniques will be explored by the upper division student with emphasis on experimental problems and possibilities. The development of an individual point of view will predominate throughout the course. May be repeated twice. Pr.: ART 655.

ART 685. Advanced Independent Study Design. (Var.) I, II, S. Advanced work in design-related subjects. Pr.: Full sequence of courses related to problem subject matter.

ART 690. Techniques in Teaching Art. (Var.) I. Lectures and class discussion of methods, consideration of suitable laboratory equipment, use of illustrative material, and preparation of courses of study. Pr.: Twelve hours in art or consent of instructor.

ART 695. Topics in Art History. (Var.) I, II, S. Independent exploration in selected problems in art history. Pr.: Twelve hours art history.

Graduate credit

ART 825. Seminar in Art. (2) Selected topics dealing with historical, conceptual, or philosophical issues in the visual arts. May be repeated. Pr.: Graduate standing.

ART 830. Graduate Sculpture Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 835. Graduate Drawing Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 845. Graduate Painting Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 855. Graduate Printmaking Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 865. Graduate Ceramics Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 875. Graduate Metalsmithing and Jewelry Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research.

ART 885. Graduate Independent Studies. (1–5) I, II, S. Advanced individual work offered in studio areas of ceramics, graphic design, drawing, painting, printmaking, sculpture, and metalsmithing and jewelry.

ART 899. Research in Art. (Var.) I, II, S. Research which may form the basis for the master's of fine art thesis or report.

For more information

For additional information and application materials please contact:
Gary L. Woodward
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Department of Art
Kansas State University
322 Willard Hall
Manhattan, KS 66506–0601
E-mail: garyw@ksu.edu
Home page: http://www.ksu.edu/art/

Biochemistry

Biochemistry is an interdepartmental graduate program with faculty participants from many academic departments.

Director of graduate studies

Lawrence Davis

Graduate faculty

Richard Baybutt, Ph.D., Penn State University.

Lawrence C. Davis, Ph.D., Albert Einstein College of Medicine.

Robin E. Denell, Ph.D., University of Texas, Austin.

Lisa Freeman, Ph.D., Ohio State University.

Roman R. Ganta, Ph.D., All India Institute of Medical Sciences, India.

Charles Hedgcoth, Ph.D., University of Texas.

Michael R. Kanost, Ph.D., Purdue University.

Karl J. Kramer, Ph.D., University of Arizona.

Ramaswamy Krishnamoorthi, Ph.D., University of California, Davis.

George L. Marchin, Ph.D., University of Kansas Medical Center.

Delbert D. Mueller, Ph.D., University of Oklahoma.

S. Muthukrishnan, Ph.D., Indian Institute of Science, Bangalore, India.

Frederick W. Oehme, Ph.D., University of Missouri–Columbia.

Gerald R. Reeck, Ph.D., University of Washington.

David A. Rintoul, Ph.D., Stanford University.

Thomas E. Roche, Ph.D., Washington State University.

Paul A. Seib, Ph.D., Purdue University.

Paul E. Smith, Ph.D., University of Liverpool, England.

George C. Stewart, Ph.D., University of Texas Health Science Center at Dallas.

Dolores J. Takemoto, Ph.D., University of Southern California.

Larry J. Takemoto, Ph.D., Colorado State University.

John M. Tomich, Ph.D., Guelph-Waterloo, Canada.

Xuemin (Sam) Wang, Ph.D., University of Kentucky.

Ruth Welti, Ph.D., Washington University, St. Louis.

Anna Zolkiewska, Ph.D., Nencki Institute of Exp. Biology, Poland.

Michal Zolkiewski, Ph.D., Institute of Physical Chemistry, Warsaw, Poland.

Overview

Biochemistry explores the molecular basis of life processes. It examines structure, function, assembly, and dynamic changes of macromolecules and the chemistry and dynamics of small molecules. Through use of recombinant DNA technology and new instrumentation, a revolution is underway in our understanding of the ways that plants and animals regulate metabolic processes and express genetic information. Researchers at Kansas State University are in the forefront of that revolution. The study of biochemistry at Kansas State University is conducted under a versatile arrangement through which faculty of the Department of Biochemistry and faculty in other departments cooperate in a graduate biochemistry program. Both fundamental questions about living processes and applications to living systems are supported in this interdisciplinary program.

Degree programs

The biochemistry program seeks excellence in teaching and research through a program tailored to the development of the individual student. The core curriculum is broad and students are expected to specialize through appropriate choice of advanced courses from the many offerings taught by faculty in their areas of research expertise. A strong seminar program involves presentations by eminent visiting scholars from around the world and by the faculty of many departments on campus. A graduate student seminar program provides further opportunity for acquiring insights into new developments in the field.

The Graduate Biochemistry Group administers granting of M.S. and Ph.D. degrees in biochemistry whether the research is conducted within the Department of Biochemistry or in other cooperating departments. The program of study is flexible, accommodating students with a wide range of backgrounds, including genetics, microbiology, physics, and medicine as well as the traditional chemistry, biochemistry, and biology degrees. Students are admitted to either the M.S. or the Ph.D. program based on qualifications, which include undergraduate and graduate performance, letters of recommendation, and program of study deficiencies.

Students in either the M.S. or Ph.D. degree program take the two-semester, comprehensive, core biochemistry courses Biochemistry I and II and the associated laboratories, plus a one semester course in physical biochemistry. All students are expected to attend the weekly graduate student seminar and individual research group meetings. For the M.S. degree, students must complete 22 to 24 hours of course work and do research leading to a satisfactory thesis. For the Ph.D., 10 hours of biology courses are required, and advanced chemistry courses are encouraged.

Admission to candidacy for the Ph.D. requires satisfactory performance in the two core biochemistry courses, and, early in the second year, preparation and defense of a research proposal on a topic selected by the student in consultation with their supervisory committee. This defense serves as the preliminary examination for admission to candidacy for the Ph.D. Approximately 30 to 40 hours of course work are required for the Ph.D., in addition to research for a satisfactory dissertation.

Entrance requirements

Applicants must have a bachelor's degree from an accredited institution, appropriate and adequate course work, and an average of B or better in the junior and senior years or an excellent postgraduate record at another institution. Provisional admission may occur when there are limited deficiencies in undergraduate course work that can be removed by course work taken at Kansas State University or when there is uncertainty in evaluation of transcripts, as may occur in the case of international students. In the latter case, removal of the provisional status occurs upon the accumulation of 9 hours of course work with a B or better average.

Undergraduate and postgraduate credits should include analytical, organic, and physical chemistry, calculus, physics, and a semester of biology including a laboratory. Physical chemistry may be completed as part of an M.S. or Ph.D. program, but all other deficiencies must be completed without graduate credit.

No foreign language is required.

All applicants are required to take the Graduate Record Exam.

International students

A minimal score of 550 on the Test of English as a Foreign Language (TOEFL) is required for admission to the Graduate School, for any student whose national language is not English. Because beginning graduate students in biochemistry are appointed as combined teaching/research assistants, a Test of Spoken English (TSE) score of 50 of 60 is required by the Board of Regents. The test may be taken here or abroad. Students accepted into the biochemistry program usually have a TOEFL score of >620, or submit a TSE score of 50 of 60 or better with the application.

Financial support of graduate students

Within the Department of Biochemistry, support for graduate teaching assistants is through the College of Arts and Sciences. Graduate research assistants are supported through the Agricultural Experiment Station and by research grants. Usually a student is admitted to the graduate program in biochemistry only if university funds are available for salary support or if the student has another source of support such as a government (U.S. or other) fellowship. U.S. citizens with a strong undergraduate record can apply for NSF predoctoral fellowships. Some supplements to teaching and research support are available on a competitive basis from the Graduate School, for outstanding U.S. students.

Incoming students receive half of their support in the form of teaching assistantships (requiring six contact hours per week) and half in the form of a research assistantship. After the first year, the teaching assistantship may be replaced by extramural support. This is expected for Ph.D. candidates beyond their third year of study. For 1999–2000 the anticipated level of support is about $15,000. This should rise in future years.

Student fees

For graduate teaching assistants and graduate research assistants, student fees are assessed at the in-state level. Students receiving such support are required to enroll in 10 credit hours each semester. A waiver of half the tuition costs is provided to those supported as combined graduate teaching/research assistants.

Research environment and facilities

More than two dozen faculty members are formally associated with the Graduate Biochemistry Group. Many others with interests in biochemistry and molecular biology are collaborative investigators and participants on graduate student supervisory committees. The research environment in biochemistry is exciting and vigorous because of these diverse but interacting programs. Our graduates compete favorably with those from the world's best programs because they are well

trained in biochemical literature and research techniques. Members of the group currently receive more than $2 million per year in outside research funds. These funds support technicians, post-doctoral fellows, and some graduate research assistants at later stages of their career. They also allow purchase of up-to-date research equipment and supplies.

The department has 14 large research suites. Seven are located in the Chemistry-Biochemistry Building. That building also houses the department's teaching laboratories. The department is well equipped for advanced research in a wide range of areas. NMR studies are conducted within the NMR Center using a Varian 500 MHz Unity Plus NMR with triple channel detection, pulse-field gradient, and high stability temperature control and waveform generation. Data collection and processing are done with Silicon Graphics Indigo work stations. Other biophysical studies are conducted with conventional and magnetic circular dichroism, fluorescence spectroscopy with fluorescence polarization capability and UV-Visible differential scanning spectroscopy. A new analytical ultra centrifuge (Beckman XL-I) and micro calorimeters (MicroCal VP-DSC and isothermal titration calorimeter) enhance studies of macromolecule interactions and folding properties.

The department has equipment and technical know-how for gene cloning (supported by polymerase-chain reaction capabilities), preparation of monoclonal antibodies, and all varieties of electrophoresis experiments. For preparative procedures the department has multiple ultracentrifuges, high pressure liquid chromatographs, and facilities for both anaerobic enzyme preparations and large scale preparations of subcellular organelles. The department has several cold rooms, animal cell culture facilities, instrument rooms, and dark rooms. Facilities are available for housing animals and growing plants year-round. Analytical instruments include scintillation counters, gamma counters, scanning spectrophotometers, and absorbance, fluorescence, and electrochemical detection for analysis of samples separated by HPLC. The university biotechnology center is housed within the biochemistry department and provides both instruments and expertise for oligonucleotide synthesis, peptide synthesis and gas-phase peptide sequencing. High resolution purification of peptides, and synthesis of peptides containing non-natural amino acids, are areas of special interest.

Additional facilities are also available on campus: DNA sequencing, fluorescence-activated cell sorting, electron microscopy (transmission and scanning), quasi-elastic light scattering, GLC-mass spectrometry, emission spectrometry, Fourier-transform infrared spectrometry, atomic absorption and stopped flow kinetics. Parallel computing, mini super-computers, ethernet and internet networks are available throughout the campus. There are 5 DEC alpha 600 MHz workstations in the department. The Agricultural Experiment Station provides support for facilities in electronics, machining, and glass blowing so that specialized apparatus can be constructed as needed.

Job opportunities

Biochemistry and molecular biology are growth areas in the economy of the next century. Graduate training in biochemistry provides a strong base for varied academic and technological careers. Our Ph.D. and postdoctoral graduates find positions not only in departments of biochemistry, biophysics, and molecular biology, but also in biology, chemistry, pharmacology, nutrition and medicine. Doctoral graduates find positions requiring independent work in a wide range of industries including biotechnology, chemistry, pharmacology, medicine, and food technology. M.S. graduates occupy skilled technical positions in industry, government and academic research laboratories. Many also continue for the Ph.D. at this or other institutions.

Biochemistry courses

Undergraduate and graduate credit in minor field

BIOCH 521. General Biochemistry. (3) I, II, S. A basic study of the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids. Pr.: CHM 350.

BIOCH 522. General Biochemistry Lahoratory. (2) I, II, S. A one-semester laboratory course with experiments relating to carbohydrates, lipids, proteins, nucleic acids, and enzymes. Six hours lab a week. Pr.: CHM 351 and BIOCH 521 or conc. enrollment, or BIOCH 765 or conc. enrollment.

Undergraduate and graduate credit

BIOCH 755. Biochemistry I. (3) 1. An introduction to physical methods. kinetics, and thermodynamics of biochemical reactions and bioenergetics, chemistry of proteins and amino acids, carbohydrate chemistry, and metabolism. BIOCH 755 and 765 are for students interested in a two-semester comprehensive coverage of biochemistry. For a one-semester course, enroll in BIOCH 521. Pr.: *Chemical analysis, one year of organic chemistry, differential and integral calculus.

BIOCH 756. Biochemistry I Laboratory. (2) I. An intensive laboratory course to accompany BIOCH 755. BIOCH 756 and 766 are sequential courses for students interested in a two-semester comprehensive coverage of experiments in biochemistry. For a one-semester laboratory course, enroll in BIOCH 522. Six hours lab a week. Pr.: *BIOCH 755 or conc. enrollment.

BIOCH 765. Biochemistry II. (3) II. Continuation of BIOCH 755; lipid chemistry and metabolism, amino acid metabolism, nutrition, nucleic acid chemistry and metabolism, integration of biochemical pathways and metabolic control mechanisms. Pr.: *BIOCH 755.

BIOCH 766. Biochemistry II Laboratory. (2) II. A continuation of BIOCH 756. Six hours lab a week. Pr.: *BIOCH 756 and 765 or conc. enrollment.

BIOCH 790. Physical Biochemistry. (3) 1. A survey of biophysical methods most frequently encountered in biochemistry and related disciplines. The course emphasizes principles underlying methods used to determine the molecular weight and shape of biopolymers, and techniques used to detect conformational changes in polynucleotides, proteins, and polysaccharides. Pr.: *Calculus, a course in physical chemistry, BIOCH 755, 756, 765, and 766.

BIOCH 799. Problems in Biochemistry. (Var.) I, II, S. Problem may include laboratory and/or library work in various phases of biochemistry, agricultural chemistry, or nutrition. Pr.: *Background adequate for problem undertaken.

Graduate credit

BIOCH 806. Biochemistry Seminar. (0–1) I, II. Seminar for graduate students in biochemistry.

BIOCH 815. Nuclear Magnetic Resonance (NMR) Spectroscopy of Macromolecules. (2) Intersession only. A lecture and laboratory course on 'state-of-the- art' multidimensional nuclear magnetic resonance methods and strategies in solving three dimensional structure of peptides, proteins, nucleic acids and other macromolecules.

BIOCH 840. Intermediary Metabolism. (3) On sufficient demand. Metabolic role of carbohydrates, lipids, proteins and amino acids, purines, pyrimidines, vitamins, and hormones; biological oxidations: mechanisms of energy production and utilization. Pr.: *BIOCH 755 and 765.

BIOCH 845. Hormones. (3) I, in even years or on sufficient demand. The structure, biosynthesis, biochemical role, metabolism, and interrelations of hormones in vertebrates and invertebrates. Pr.: BIOCH 765.

BIOCH 890. Advanced Topics in Biochemistry. (1–3) I, II, S. Course to present timely topics in Biochemistry. Pr.: Consent of instructor.

BIOCH 899. Research in Biochemistry I. (Var.) I, II, S. Research in biochemistry which may be used for preparation of the M.S. thesis. Pr.: Sufficient training for research undertaken.

BIOCH 905. Advanced Topics in Plant Biochemistry. (3) I, in even years. An advanced treatment of topics of current interest in plant biochemistry, including photosynthesis and carbon metabolism, nitrogen fixation and nitrogen metabolism, structure and function of the higher plant genome, and production of material of economic interest. Pr.: BIOCH 765

BIOCH 910. Lipids. (2) I, in odd years. Chemistry of plant and animal lipids, their occurrence, metabolism, and industrial uses. Pr.: *BIOCH 765.

BIOCH 920. Nucleic Acids. (2) II, in even years. Structure and function of nucleic acids: structures and properties of DNA, RNA, and chromatin; recombinant DNA techniques; mutagenesis and carcinogenesis; protein-nucleic acid interactions; structural influences on replication, transcription, translation, and regulation. Pr.: BIOCH 765.

BIOCH 930. Proteins. (2) I, in odd years. Lectures and readings on the chemical nature of proteins; fractionation; purification, structure, chemical and physical properties of proteins and amino acids. Pr.: *BIOCH 755 and 765.

BIOCH 940. Chemistry of Carbohydrates. (2) I. On sufficient demand. Lectures and readings on structural chemistry of carbohydrates, their general properties, biological and chemical reactions, and the methods of characterization. Pr.: *BIOCH 755 and 765.

BIOCH 950. Enzyme Chemistry. (3) II, in odd years. The following properties of enzymes are considered: structure, specificity, catalytic power, mechanism of action, multienzyme complexes, kinetics, regulation, and pacemaker properties in multienzyme systems. Pr.: *BIOCH 765.

BIOCH 997. Postdoctoral Research in Biochemistry. (1–12) I, II, S. Advanced level research in collaboration with a faculty member, involving projects in any area of biochemistry. Post-graduate training in first three years beyond doctorate. Pr.: Ph.D. or equivalent.

BIOCH 999. Research in Biochemistry II. (Var.) 1, II, S. Research in biochemistry which may be used for preparation of the Ph.D. thesis. Pr.: Sufficient training for research undertaken.

*Nonmajors lacking these prerequisites should obtain consent of instructor before enrollment.

For more information

For additional information and application materials please contact:
Lawrence C. Davis
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Biological and Agricultural Engineering

Head
James K. Koelliker

Director of graduate studies
Naiqian Zhang

Graduate faculty
Cheng S. Chang, (Adjunct) Ph.D., North Carolina State University.

Do Sup Chung, Ph.D., Kansas State University.

Gary A. Clark, Ph.D., Texas A&M University.

Floyd E. Dowell, (Adjunct) Ph.D., University of Illinois.

Lawrence J. Hagen, (Adjunct) Ph.D., Kansas State University.

Joseph P. Harner III, Ph.D., Virginia Polytechnic Institute and State University.

Prasanta K. Kalita, Ph.D., Iowa State University.

James K. Koelliker, Ph.D., Iowa State University.

Ronaldo G. Maghirang, Ph.D., Pennsylvania State University.

Kyle R. Mankin, Ph.D., The Ohio State University.

Danny H. Rogers, Ph.D., Oklahoma State University.

Mark D. Schrock, Ph.D., Kansas State University.

John W. Slocombe, Ph.D., Iowa State University.

Charles K. Spillman, Ph.D., Purdue University.

James L. Steele, (Adjunct) Ph.D., Iowa State University.

James M. Steichen, Ph.D., Oklahoma State University.

Randal K. Taylor, Ph.D., University of Nebraska.

Larry E. Wagner, (Adjunct) Ph.D, Kansas State University.

Naiqian Zhang, Ph.D., Virginia Polytechnic Institute and State University.

Program description

The Department of Biological and Agricultural Engineering offers courses of study leading to the master of science in biological and agricultural engineering, and the doctor of philosophy in engineering. The department consists of 14 graduate faculty members, about 25 graduate students, and five adjunct professors. Master of science students may specialize in (1) environmental engineering, (2) food and feed process engineering, (3) information and electrical technology, (4) machinery systems, (5) natural resource engineering, and (6) structure and enviornment. Minimum degree requirements are 30 semester hours of graduate credit, including a master's thesis of 6 semester hours based upon original research or a master's report of 2 semester hours of research or problem work.

A generalized doctoral program is offered by the College of Engineering through each department. The traditional areas of specialization are integrated into the following five interdisciplinary areas: (1) energy utilization, (2) informational systems, (3) materials engineering, (4) systems engineering, and (5) bio-environmental engineering. Award of a doctorate requires the successful completion of the equivalent of at least three full years of full-time study beyond the baccalaureate as well as the completion of a major research study reported in a doctoral dissertation. For information about the Ph.D. program, see the Engineering section of this catalog.

Program requirements

Admission requires a bachelor of science in agricultural engineering or its equivalent and meeting all the Graduate School admission requirements. Graduates from other engineering curricula or a strong physical science or biological science curriculum may be admitted provisionally with undergraduate deficiencies specified.

Application for admission to a graduate program in biological and agricultural engineering should be made six months prior to the start of the term in which enrollment is desired. Additional information on graduate programs and an application for admission to the Graduate School of Kansas State University may be obtained by writing the department.

A TOEFL score of 550 or higher is required of those students whose native language is not English. The TOEFL score must be less than two years old. Students meeting all requirements for admission except for the TOEFL score may be admitted to the Graduate School on a provisional status. They may enroll upon scoring 550 or more on a subsequent TOEFL or after successfully completing the English Language Program at Kansas State University.

Research facilities

The department is located in Seaton Hall. There are 15 well-equipped instructional and research laboratories, including the computer laboratory, instrument and control, physical properties, image processing, thermal food processing, grain wet processing, air quality and control, water quality and control, hydrology, engine testing, machinery systems, and biomass energy systems. Field studies may be carried out at experiment fields near Topeka and St. John and at Research Extension Centers near Garden City and Colby. Opportunities also exist for research in the U.S. Grain Marketing and Production Research Center and the Wind Erosion Research Unit, USDA-ARS, both located in Manhattan.

Financial support

Students are admitted into the biological and agricultural engineering graduate program either with an assistantship that pays a stipend from university funds or with their own source of financial support. A limited number of assistantships providing teaching and research experiences are available. Graduate assistant appointments are usually at four-tenths time. Fees are assessed at the same rate as university employees for graduate teaching assistants and graduate research assistants.

Biological and agricultural engineering courses

Undergraduate and graduate credit in minor field

BAE 500. Properties of Biological Materials. (2) II. Characterization of biological material properties that affect the design and analysis of material handling equipment and processes. Physical, electrical, thermal, mechanical, aerodynamic, hygroscopic, and rheological properties of grain and other agricultural products will be examined. One hour rec. and three hours lab a week. Pr.: PHYS 213.

BAE 510. Environmental Design of Agricultural Buildings. (3) I. Theory and application of psychrometrics, air dilution, and heat and mass transfer; study of animal's interaction with its environment; computer-aided design and analysis of environmental control systems for plants and animals. Two hours rec. and three hours lab a week. Pr.: BAE 200. Pr. or conc.: ME 513.

BAE 512. Functional Analysis of Agricultural Machinery. (3) II. Kinematics, power transmission, and basic hydraulics as applied to tillage, planting, and harvest machinery. Two hours rec. and three hours lab a week. Pr.: ME 512 or CE 530.

BAE 521. Energy in Biological Systems. (3) II. Energy and material balances, process analysis and efficiency. Combustion, steam generation, fuel properties, and exhaust emissions. Net energy analysis and environmental consequences of biological production and processing systems. Analysis and design of systems for the production of biomass fuels. Three hours rec. a week. Pr. or conc.: ME 513.

BAE 530. Natural Resources Engineering. (3) II. Principles and measures for controlling storm water runoff and soil erosion; design of water handling structures for land drainage, flood protection, and irrigation; agricultural surveying. Two hours rec. and three hours lab a week. Pr.: BAE 551, AGRON 305; Pr. or conc.: ME 571.

BAE 536. Agricultural Engineering Design I. (3) I. Analysis and design of equipment and systems for the production and processing of food and fiber. Introduction to structural and process analysis using finite element techniques and engineering economics. Concepts of mechanical design, system design, human factors, and reliability in design are applied in a project-oriented laboratory. Two hours res. and three lab a week. Pr.: ME 512 or CE 530.

BAE 551. Hydrology. (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr.: PHYS 113 or 213. Same as CE 551.

BAE 566. Design of Agricultural Structures. (3) II. Application of statics and strength of materials to the design and analysis of light-frame structures of wood, steel, and concrete; estimation of wind, snow, grain, and soil loads; stress analysis of beams, columns, frames, trusses, and foundations; computer-aided drafting and introducation to finite element analysis. Three hours rec. a week. Pr.: CE 533.

BAE 575. Fundamentals of Agricultural Process Engineering. (3) I. Application of basic science and engineering fundamentals for the analysis and design of agricultural processes. Two hours rec. and three hours lab a week. Pr. or conc.: CHE 314 or ME 571.

Undergraduate and graduate credit

BAE 620. Problems in Agricultural Engineering. (Var.) I, II, S. Problems in the design, construction, or application of machinery or power in agriculture, structures, modern conveniences, and rural electrification. Pr.: Approval of instructor.

BAE 625. Thermal Processing Operations in Food Engineering. (3) II, in odd years. Analysis of thermal processing operations such as dehydration, drying, evaporation, canning, freezing, and freeze drying. Two hours rec. and three hours lab a week. Pr.: CHE 530 or BAE 575.

BAE 630. Food Process Engineering Laboratory. (1) II, in odd years. Laboratory studies of food processing unit operations and applicatons with emphasis on heat and mass transfer operatiosn. Three hours lab a week. Pr.: BAE 575 or CHE 531. Pr. or conc.: BAE 625.

BAE 635. Food Plant Design. (3) II, in even years. Synthesis and design of different food processing plants such as cereal, dairy, fruit, and vegetable. Two hours rec. and three hours lab a week. Pr. or conc.: BAE 625.

BAE 636. Agricultural Engineering Design II. (Var.) II. Fabrication, evaluation, and refinement of a prototype machine or device designed in BAE 536. Pr.: BAE 536.

BAE 640. Instrumentation and Control for Biological Systems. (3) II. Fundamentals of instrumentation and control engineering applied in biological and agricultural systems and processes. Time-domain analysis and frequency response methods. Sensors and actuators in feedback control systems. Control system design. Case studies. Two hours rec. and three hours lab a week. Pr.: EECE 510 or EECE 519, and MATH 240.

BAE 651. Air Pollution Engineering. (3) II. Air pollution legislation, standards, measurement, and terminology. Design and economics of particulate pollution control systems including cyclones, fabric filters, wet scrubbers, and electrostatic precipitators. Abatement of gas and vapor pollution using VOC incineration, and gas absorption. Meteorology and atmospheric dispersion modeling. Three hours rec. Pr.: ME 513, 571.

BAE 690. Non-Point Pollution Engineering. (3) I. Management of diffuse sources of pollution generally resulting from storm water and runoff. Use of models and Geographic Information Systems (GIS) to evaluate the extent and magnitude of non-point pollution, legislation and programs affecting non-point pollution, and design of treatment and management systems. Non-point pollutants addressed include: nutrients, pesticides, sediment, and hazardous wastes. Three hours lec. a week. Pr.: BAE 551 or CE 551.

Graduate credit

BAE 700. Agricultural Process Engineering. (3) II. Theory, equipment, and design techniques in processing agricultural products. Two hours rec. and three hours lab a week. Pr.: BAE 575.

BAE 705. Irrigation Engineering. (3) II. Design and operative problems on the fundamentals of irrigation system design and management. Soil, plant, and water relationships; pipeline and system hydraulic design; design of irrigation systems; filtration systems and chemigation; sources of water and water quality. Two hours rec. and three hours lab a week. Pr.: BAE 551 and AGRON 305. Pr. or conc.: ME 571.

BAE 712. Analysis and Design of Off-Highway Vehicles. (3) II, in odd years. Analytical study of design, testing, construction, and operating characteristics of off-highway vehicles and machinery. Includes human factors, mobility, and precision agriculture. Two hours rec. and three hours lab a week. Pr.: BAE 536 or ME 574.

BAE 810. Research in Agricultural Engineering. (Var.) I, II, S. The laboratories of the University are available for research in all areas of agricultural engineering. The results of such investigation may be incorporated in bulletins of the Agricultural Experiment Station. Pr.: Approval of department head.

BAE 811. Particle Technology. (3) I. Science and behavior of airborne particles or aerosols. Technology and methods for measuring, controlling, and utilizing aerosols in the agricultural and food industries. Specific topics include basic particle mechanics; principles of particle measurement; particle statistics; electrostatic precipitation; condensation; evaporation; dust generation; and filtration. Two hours rec. and three hours lab a week. Pr.: STAT 703 and PHYS 113 or 213.

BAE 815. Graduate Seminar in Agricultural Engineering. (1) I, II. Presentation and discussion of research philosophies, procedures, and results. One hour rec. a week. Required of all graduate students in agricultural engineering. Pr.: Graduate standing.

BAE 820. Topics in Agricultural Engineering. (Var.) On sufficient demand. A course reserved for study of current topics in agricultural engineering. Topics announced when offered. May be repeated up to a maximum of 9 credit hours. Pr.: 9 credit hours of graduate courses.

BAE 840. Measurement Systems. (3) I. Theory and application of measurement systems for biological and agricultural systems with emphasis on sensors and data-acquisition systems for measurement of variables related to soils, plants, animals, machines, and processes. Two hours rec. and three hours lab a week. Pr.: BAE 640.

BAE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

BAE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

BAE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head.

For more information

For additional information and application materials please contact:
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Biology

Director
Brian S. Spooner.

Graduate affairs chair
David A. Rintoul

Graduate faculty
Warren B. Ballard, (Adjunct) Ph.D., University of Arizona.

Donald B. Bechtel, (Adjunct) Ph.D., Kansas State University.

John M. Blair, Ph.D., University of Georgia.

Daniel L. Boyle, Ph.D., University of Louisville.

John M. Briggs, Ph.D., University or Arkansas.

Susan A. Brown, Ph.D., University of Missouri.

Ted T. Cable, Forestry; Ph.D., Purdue University.

Stephen Keith Chapes, Ph.D., University of Illinois.

Rollie J. Clem, Ph.D., University of Georgia.

Scott L. Collins, (Adjunct) University of Oklahoma.

Abigail H. Conrad, Ph.D., Yale University.

Gary W. Conrad, Ph.D., Yale University.

Richard A. Consigli, Ph.D., University of Kansas.

Jack F. Cully, Jr., (Adjunct) Ph.D., University of New Mexico.

Antoni W.H. Damman, Ph.D., University of Michigan.

Robin E. Denell, Ph.D., University of Texas–Austin.

Walter K. Dodds, Ph.D., University of Oregon.

James E. Garvey, Ph.D., Ohio State University.

Philip S. Gipson, Ph.D., University of Arkansas.

James A. Guikema, Ph.D., University of Michigan.

Christopher S. Guy, Ph.D., South Dakota State University.

David C. Hartnett, Ph.D., University of Illinois.

Michael A. Herman, Ph.D., Massachusetts Institute of Technology.

Ronald D. Hiebert, (Adjunct) Ph.D., University of Kansas.

Loretta C. Johnson, Ph.D., University of Connecticut.

Terry C. Johnson, Ph.D., University of Minnesota.

Donald W. Kaufman, Ph.D., University of Georgia.

Glennis A. Kaufman, Ph.D., Kansas State University.

Harold E. Klaassen, Ph.D., University of Washington.

Alan K. Knapp, Ph.D., University of Wyoming.

Jan E. Leach, Plant Pathology; Ph.D., University of Wisconsin.

Marian L. Lewis, (Adjunct) Ph.D., University of Houston.

George L. Marchin, Ph.D., University of Kansas Medical School.

Harish C. Minocha, Laboratory Medicine; Ph.D., Kansas State University.

Beth A. Montelone, Ph.D., University of Rochester.

A. Lorena Passarelli, Ph.D., University of Georgia.

Avelina Q. Paulsen, Ph.D., University of Wisconsin.

Jean-Pierre Perchellet, Ph.D., University of Paris VI.

Gerald R. Reeck, Biochemistry; Ph.D., University of Washington.

Charles W. Rice, Agronomy; Ph.D., University of Kentucky.

David A. Rintoul, Ph.D., Stanford University.

Robert J. Robel, Ph.D., Utah State University.

Judith L. Roe, Ph.D., Johns Hopkins University.

Jyoti Shah, Ph.D., University of Notre Dame.

Christopher C. Smith, Ph.D., University of Washington.

Brian S. Spooner, Ph.D., Temple University.

Delores J. Takemoto, Biochemistry; Ph.D., University of Southern California.

Larry J. Takemoto, Ph.D., Colorado State University.

Scott C. Todd, Ph.D., University of California, San Diego and San Diego State University.

A. Spencer Tomb, Ph.D., University of Texas-Austin.

Ronald W. Trewyn, Ph.D., Oregon State University.

Steve J. Upton, Ph.D., Auburn University.

James E. Urban, Ph.D., University of Texas–Austin.

Jerry S. Weis, Ph.D., University of Kansas.

Ruth Welti, Ph.D., Washington University in St. Louis.

Ronald West, Geology; Ph.D., University of Oklahoma.

Larry G. Williams, Ph.D., California Institute of Technology.

Fred E. Wilson, Ph.D., Washington State University.

Peter P. Wong, Ph.D., Oregon State University.

Program overview

The Division of Biology offers master of science and doctor of philosophy degrees in two areas: biology and microbiology. To support this effort, the graduate faculty is committed to a vigorous research and instructional program.

Since biology and microbiology are very broad disciplines, and to provide a structural profile of our faculty research interests, we have formed the following areas of interest:

Genetic, developmental, and cellular biology
Bechtel, S. Brown, A. Conrad, G. Conrad, Denell, Herman, Montelone, Rintoul, Roe, Shah, Spooner, L. Takemoto, Welti, Williams

Microbiology and immunology
Chapes, Clem, Consigli, Dodds, T. Johnson, Marchin, Montelone, Todd, Upton, Urban, Wong

Systematics and ecology
Blair, Briggs, Cully, Damman, Dodds, Garvey, Hartnett, L. Johnson, D. Kaufman, G. Kaufman, Klaassen, Knapp, Rice, Robel, Smith, Tomb, West

Fisheries and wildlife
Cully, Garvey, Gipson, Guy, Klaassen, Robel

Plant and animal physiology
Guikema, Leach, Roe, Shah, Weis, Wilson, Wong

Virology and oncology
Chapes, Clem, Consigli, Denell, T. Johnson, Minocha, Paulsen, Perchellet, Reeck, Rintoul, D. Takemoto, L. Takemoto, Trewyn

Programs

Biology and microbiology are exceedingly broad disciplines, and the graduate program exploits this exciting diversity. The graduate faculty of the Division of Biology strongly believes that research is the preeminent feature of our training responsibilities. Our faculty is a coalition of scientists who focus a wide diversity of experimental expertise on graduate education—ranging from the study of virus assembly and the biology of a cancer cell, to the interaction of grazing bison with plant growth on our expansive tall grass prairie. Graduate opportunities are available, in all areas of biology, including developmental biology, ecology, wildlife biology, cancer biology, virology, physiology, immunology, parasitology, and molecular genetics.

In partnership with a major advisor and a supervisory committee, each graduate student formulates a mixture of course work and research to comprise an individualized program of study. This partnership tailors the program to the needs of each student, and selects from a set of available courses those which present recent and exciting developments in the student's area of interest. A minimum of 30 hours past the bachelor's degree is required for a master of science; a minimum of 90 hours for a doctor of philosophy. We require that each student write a thesis based on original research, of sufficient quality and importance to merit publication in a refereed journal.

Facilities

The research-oriented graduate training activities of the biology graduate faculty are performed in three on-campus sites—Ackert Hall, Bushnell Hall, and Leasure Hall—as well as at off-campus sites like the Konza Prairie Research Natural Area, the Lyndon B. Johnson Space Center, and the Kennedy Space Center.

Ackert Hall
With some 130,000 square feet, Ackert Hall is the main biology facility. Ackert Hall provides modern well-equipped laboratories for teaching and research, and, in addition, contains the division offices, a three-section rooftop greenhouse, an electronics shop, a research supply storeroom, and small animal rooms. Equipment available for research includes ultracentrifuges, beta and gamma counting systems, high performance liquid chromatography systems, growth chambers, a research microscope facility (with confocal and transmission electron microscope plus image processing capabilities), and glassware cleaning and sterilizing facilities.

Bushnell Hall
Graduate faculty members with an interest in environmentally oriented studies have offices and laboratory space in Bushnell Hall. Included in this building are the herbarium, three environmental chambers, dark rooms, and tanks for fish culture ranging from 100- to 2,000-liter capacity. Extensive computing and imaging facilities support the climatology and remote sensing activities.

Leasure Hall
Leasure Hall is used to house the Kansas Cooperative Fish and Wildlife Research Unit. This unit is a partnership of the U.S. Department of the Interior, Kansas State University, the Kansas Department of Wildlife and Parks, and the Wildlife Management Institute. Three U.S. Department of the Interior employees, as Division of Biology adjunct graduate faculty members, coordinate fisheries and wildlife research programs with state and university participation.

Konza Prairie Research Natural Area
Approximately 8,616 acres of native tall grass prairie has been set aside as a unique outdoor laboratory for long-term research. This land was purchased by the Nature Conservancy with funds provided by Katharine Ordway. Land management is designed to provide experimental manipulations, in order to understand patterns and processes in maintaining the prairie ecology.

Research strengths

The biology graduate faculty has a proven track record in scientific achievement, and continues to excel in competition for extramural research funding. Our programs are funded by the state, through the Kansas Agricultural Experiment Station, and by direct grants to our faculty members from the National Science Foundation, National Institutes of Health, National Aeronautics and Space Administration, American Heart Association, and the American Cancer Society. Areas of strength, which provide research opportunities for our graduate students, can be illustrated by collaborative research funding in such areas as:

Long-Term Ecological Research
The National Science Foundation has continued to support research on the Konza Prairie since 1980. The study is designed to investigate gradual and subtle changes that influence plant and animal populations on the tall grass prairie, the impact of human activities on ecosystem productivity, and variations in ecological processes caused by burning and grazing.

NASA Specialized Center of Research and Training in Gravitational Biology
Research and training focuses on space life science, with an emphasis on the role that gravity plays in influencing cellular development. Center trainees benefit from unique collaborative opportunities with the University of Colorado, Mount Desert Island Biological Laboratory, and residency programs at NASA Research Field Centers.

Virology and tumor biology training program
This predoctoral program, funded by the National Cancer Institute, provides many of the essential experimental skills necessary for solving research problems in modern virology and tumor biology.

BioServe Space Technologies
In cooperation with Aerospace Engineering Sciences at the University of Colorado, the Division of Biology leads this NASA Center for the Commercial Development of Space. Projects are focused on applications of the space environment in areas of significant impact, including biotechnology, pharmaceuticals, and agrigenetic materials.

Admission

Incoming students generally have degrees in biology, biochemistry, wildlife biology, or a comparable field. However, the overwhelming considerations are an intensive interest in biology or microbiology, and minimum prerequisites for admission into our programs. Application procedures require (1) a completed application form, (2) a statement of professional goals and objectives, (3) transcripts from all colleges and universities attended, (4) three letters of recommendation, and (5) GRE scores. Additional Graduate School regulations apply to applicants from outside of the United States.

Financial support

Because of the strength of our faculty efforts in obtaining research funding, we normally provide 12-month financial assistance to the graduate students we accept into our program. This level of assistance is competitive with that offered by other midwestern universities. Students receiving support are eligible for in-state tuition and fees.

Biology courses

Undergraduate and graduate credit in minor field

BIOL 500. Plant Physiology. (4) I. Detailed consideration of physiological processes of higher plants. Three hours lec. and three hours lab a week. Pr.: BIOL 201 or BIOL 210; and a course in organic chemistry.

BIOL 505. Comparative Anatomy of Vertebrates. (4) I. Interpretation of vertebrate structure with emphasis on function and phylogeny. Two hours lec. and six hours lab a week. Pr.: BIOL 198.

BIOL 510. Embryology. (3) II. Developmental anatomy and physiology of reproduction of birds and mammals. Three hours lec. a week. Pr.: BIOL 198.

BIOL 511. Embryology Laboratory. (1) II. One three-hour lab a week. Pr.: BIOL 510 or conc. enrollment.

BIOL 513. Physiological Adaptations of Animals. (3) I. Integration of physiological mechanisms as the basis for adaptive responses of animals to different environments. Pr.: BIOL 201; and a course in organic chemistry or biochemistry.

BIOL 514. Physiological Adaptations of Animals Laboratory. (1) I. One three-hour lab a week. Pr.: Conc. enrollment in BIOL 513.

BIOL 515. Behavioral Ecology. (3) II. Study of the social, environmental, genetic, and evolutionary processes that affect animal behavior. Topics include: evolution of social organization, spacing and group behavior, mating systems and parental care, sexual selection, communication, aggression, habitat selection, and foraging. Research project required. Pr.: BIOL 201.

BIOL 526. Human Physiology. (3) II. Functions of various organ systems of mammals, primarily humans. Three hours lec. a week. Pr.: BIOL 198; and a course in biochemistry or organic chemistry.

BIOL 529. Fundamentals of Ecology. (3) I. Ecosystem structure and function including energy flow; biogeochemical cycling; effect of climate, soil, fire, succession; application to land management practices. Three hours lec. a week and optional field trips. Pr.: BIOL 201 or 210; and CHM 210.

BIOL 530. Pathogenic Microbiology. (3) I. Etiology and descriptions of major infectious diseases of humans within the perspective of host defenses. Two hours lecture and one hour laboratory-demonstration a week. Pr.: BIOL 455.

BIOL 540. Molecular Biology. (3) I. An introduction to the synthesis and regulation of DNA, RNA, and protein. Mutation and the chromosome are studied at the molecular level. Emphasis is placed on recombinant DNA technology and on the handling of biological information in both higher and lower organisms. Pr.: BIOL 201 and CHM 350.

BIOL 541. Cell Biology. (3) II. Structure and function of cells and subcellular components. A molecular understanding of membranes and cellular physiology will be emphasized. Three hours lec. Pr.: BIOL 540 and CHM 350.

BIOL 542. Ichthyology. (3) II, in even years. Classification, morphology, physiology, distribution, and natural history of fishes. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

BIOL 543. Ornithology. (3) II. Classification, morphology, physiology, distribution, and natural history of birds. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

BIOL 544. Mammalogy. (3) I. Characteristics, evolution, life histories, and ecology of mammals, especially North American game species. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

BIOL 545. Human Parasitology. (3) II. Protozoan and helminth parasites of man with lesser emphasis on ectoparasitic arthropods. Emphasis on life cycles, control, and laboratory diagnosis. Three hours lec. a week. Pr.: BIOL 201.

BIOL 546. Human Parasitology Laboratory. (1) II. Examination of prepared materials and identification of internal parasites of man. Two hours lab a week. Pr.: Conc. enrollment in BIOL 545.

BIOL 547. Herpetology. (2) II, in odd years. Classification morphology, physiology, distribution, and natural history of amphibians and reptiles. One hour lec. and three hours lab a week. Pr.: BIOL 201.

BIOL 550. Lower Plants. (3) II, in odd years. Morphology, adaptive mechanisms, and evolutionary relationships of the cellular and vascular cryptograms. Two hours lec. and one three-hour lab a week. Pr.: BIOL 201 or 210.

BIOL 551. Taxonomy of Flowering Plants. (4) I. Morphology, taxonomy, and biogeography of the vascular plants. Two hours lec. and two three-hour labs a week. Pr.: BIOL 201 or 210.

Undergraduate and graduate credit

BIOL 604. Biology of the Fungi. (3) I. An introduction to fungal structure, function, physiology, ecology, and genetics. Importance of fungi as disease organisms, as saprotrophs, and in industry. Techniques of isolation, cultivation, and as experimental organisms. Two hours lec. and two hours lab a week. Pr.: BIOL 198 or 210.

BIOL 612. Limnology. (4) I, in even years. Basic ecological principles of aquatic environments. Plants and animals of local streams, rivers, ponds, and reservoirs are used to demonstrate the interaction of biological processes with the chemical and physical features of natural aquatic environments. Three hours lec., three hours lab a week; two optional weekend field trips. Pr.: BIOL 201 and CHEM 110 or 210.

BIOL 615. Cytogenetics. (4) I, in even years. Chromosome structure and mechanics, cytotaxonomy, and karyotypic analysis in eukaryotes. Two hours lec. and six hours lab a week. Field trips. Pr.: BIOL 430 or a course in genetics.

BIOL 620. Evolution. (3) II. A study of the theory of evolution including its historical and social implications. Three hours lecture a week. Pr.: BIOL 430 or a course in genetics.

BIOL 625. Animal Parasitology. (4) I, in odd years. Biology and pathology of the principal protozoan, helminth, and arthropod parasites of domestic animals and wildlife. Three hours lec. and two hours lab a week. Pr.: BIOL 198 and junior standing.

BIOL 632. Ecology Laboratory. (1) II. Laboratory and field experiences with ecological problems. Pr.: STAT 340 or equiv.

BIOL 645. Advanced Field Studies. (1–2) Offered in intersession only. Different ecosystems and the opportunity to apply classroom knowledge to field biology situations under the guidance of experienced biologists. Pr.: One course in field biology at or above the 400 level.

BIOL 670. Immunology. (4) II. Chemical, genetic, and biological properties of the immune response, acquired immunity, and antibody production. Pr.: Two courses in biology; and a course in biochemistry or equiv.

BIOL 671. Immunology Lab. (2) II. Laboratory exercises in immunology. Pr.: BIOL 670 or conc. enrollment. Three-hour lab a week plus one hour rec.

BIOL 675. Genetics of Microorganisms. (3) I. The genetics of bacteria, viruses, and other microorganisms. Both the use of genetics in microbiological studies and the use of microbial systems to investigate basic genetic problems will be covered. Pr.: BIOL 455 and BIOL 540.

BIOL 676. Molecular Genetics Laboratory. (3) I. An advanced course in the techniques of molecular genetics and recombinant DNA technology. Emphasis will be placed on successful completion of a project that will involve several methods in modern molecular genetics. Some typical methods used in the course include mutagenesis, characterization of mutants, polymerase chain reaction, molecular cloning and DNA sequencing. One-hour lecture and two three-hour labs. Pr.: BIOL 675 or concurrent enrollment.

BIOL 680. Aquaculture. (3) I, in odd years. Principles and methods of culturing fishes for commercial purposes. Topics of study include: species of fishes used in production; breeding; feeds and feeding of fishes; fish parasites and diseases; environmental requirements; facilities; and potential markets. Two hours lec. and three hours lab a week. Pr.: Two courses in biology, two courses in chemistry, and junior standing.

BIOL 684. Wildlife Management. (3) II. Concepts of managing wildlife with emphasis on North American game species. Applied population dynamics as they relate to management, historical, and recent developments in wildlife management, habitat improvement, and related material. Three hours lec. a week. Pr.: BIOL 430 and 433.

BIOL 685. Wildlife Management Techniques. (3) I. Ecology and management techniques. Two hours lec. and three hours lab a week. Pr.: BIOL 430 and 433.

BIOL 687. Microbial Ecology. (3) II, in odd years. The ecology of aquatic and terrestrial microorganisms in their natural environment. Pr.: BIOL 455.

BIOL 690. Microbial Physiology and Metabolism. (2) II. The study of structure, function, regulation, and intermediary metabolism of bacteria. Pr.: BIOL 455; and BIOCH 521 or 765.

BIOL 696. Fisheries Management. (4) I, in even years. Methods of managing fisheries resources; physical and biological survey methods; methods of aquatic environment improvement; fish population manipulation; management of streams, ponds, and lakes. Three hours lec. and three hours lab a week. Pr.: BIOL 433.

BIOL 697. Topics in Biology. (1–6) I, II, S. Pr.: Consent of instructor.

BIOL 698. Problems in Biology. (1–8) I, II, S. Pr.: Consent of instructor.

BIOL 699. Undergraduate Seminar in Biology. (1) I, II. Pr.: Consent of instructor.

BIOL 702. Radiation Safety in the Research Laboratory. (1) I. Principles of radioactive safety and isotope handling, licensing procedures, and laboratory techniques. Pr.: BIOL 198 or 455; and CHM 210 or PHYS 113.

BIOL 710. Endocrinology. (3) II, in even years. A survey of the glands of internal secretion in vertebrates with emphasis on mechanisms of control of hormone secretion and mechanisms of hormone action. Pr.: BIOL 198; and a course in organic chemistry or biochemistry.

BIOL 719. Biomembranes. (2) II, in even years. Fundamental concepts in membrane biochemistry. Emphasis on the relationship of membrane structure and function. Includes an introduction to research literature on cellular and model membranes. Reading/discussion format. Pr.: BIOL 541 and BIOCH 521.

BIOL 730. General Virology. (3) II. Theoretical and experimental basis of virology, with emphasis on the role of the virus as a controlling force in cellular biology; principles of host-virus interactions; introduction to use of mammalian cell cultures as the host for virus propagation. Pr.: Twelve hours of biological sciences, including BIOL 455 or 540; and BIOCH 521 or equiv.; consent of instructor.

BIOL 731. Virology Laboratory. (2) II. An introduction to the techniques used in virus propagation, detection, and quantification. Emphasis will be placed on the methodology used to study virus replication and virus-host cell interactions. One-hour lec. and three-hour lab. Pr.: BIOL 730 or concurrent enrollment.

BIOL 735. Human Oncology. (3) II, in even years. Etiology and pathogenesis of human cancer, with emphasis on the biology and biochemistry of the neoplastic process; host-tumor relationships; mechanism of action of anticancer drugs; and the clinical polychemotherapy of cancer. Pr.: BIOL 540 and BIOCH 521 or equiv.

BIOL 736. Cancer Therapy. (3) II, in odd years. Current methods of cancer management with emphasis on the kinetic principles of chemotherapy and radiation therapy; diagnosis; surgical oncology; oncologic emergencies; adverse effects of cancer therapy; and the new therapies. Pr.: BIOL 540 and BIOCH 521 or equiv.

BIOL 740. Anatomy of Higher Plants. (3) II. Structure and development of the various tissues and organs of seed plants. Two hours lec. and one two-hour lab a week. Pr.: BIOL 201 or 210.

BIOL 755. Specialized Cell Functions. (3) I, in even years. In vitro cell and organ culture techniques as tools for differentiation and specialization studies. Emphasis on mammalian cell culture systems with some study of plant cell culture. Pr.: BIOL 541.

BIOL 760. Genetic Engineering. (2) I. An in-depth coverage of techniques and approaches currently used in gene cloning. Recent papers which describe the application of gene cloning to basic research will be read and discussed. Pr.: BIOL 540.

Graduate credit

BIOL 800. Advanced Plant Physiology I. (3) II, in even years. Modern concepts and research in plant physiology. Respiration, photosynthesis, and water relations of plants. Pr.: An introductory plant physiology course or general biochemistry.

BIOL 801. Advanced Plant Physiology II. (3) II, in odd years. Modern concepts and research in plant physiology. Mineral nutrition, translocation, growth, and development of plants. Pr.: An introductory plant physiology course or general biochemistry. Previous enrollment in BIOL 800 is not required.

BIOL 805. Advanced Mycology. (3) II, in even years. Study of fungi, with emphasis on structure, identification, classification, phylogeny, and economic importance. One hour lec. and six hours lab a week. Pr.: BIOL 704.

BIOL 815. Advanced Fisheries Management. (3) II, in odd years. Advanced study of theory and techniques related to managing freshwater fisheries. Emphasis will be placed on current research needed to support management practices such as sampling, indices, harvest regulations, predator-prey interactions, community structure, ecosystem management. Pr.: BIOL 542 and BIOL 696.

BIOL 825. Evolution of Animal Behavior. (4) II, in even years. The study of mechanisms, ontogeny, and evolution of behavior stressing the adaptive nature of behavior. Two hours lec., one hour of discussion on assigned readings, and two to three hours lab a week. Lab format will be individual research projects requiring independent research skills. Pr.: BIOL 430 or equiv.

BIOL 826. Nutrient Dynamics. (3) II, in odd years. The cycling of elements in ecosystems with emphasis on macronutrients such as nitrogen, phosphorous, and major cations, and the influence of variables such as acid rain on nutrient dynamics. Two hours lec. and two hours lab a week. Pr.: BIOL 529 and CHM 210.

BIOL 828. Conservation Biology. (3) II, even years. Study of factors that threaten biodeversity and strategies/techniques to minimize or reverse those threats. Considers how spatial and temporal scale lissues affect management decisions, how molecular techniques have been used to elucidate problems of scale and the social and economic factors that affect implementation of conservtion techniques. Pr.: BIOL 430 or BIOL 529 and ASI 500 or equivalent.

BIOL 830. Advanced Virology. (4) I, in even years. Application of current biochemical, biophysical, and biological techniques to the study of viruses, including bacterial viruses (bacteriophage), animal viruses, and plant viruses. Pr.: BIOL 730 and consent of instructor.

BIOL 835. Cellular and Molecular Parasitology. (3) I, in even years. Biochemistry, immunology, and molecular biology of medically important eukaryotic parasites. Three hours lec. Pr.: BIOCH 521 or equivalent.

BIOL 840. Molecular and Cellular Immunology. (3) I, in even years. Discussions and readings covering the molecular and cellular interactions during various phases of the immune response. Pr.: BIOL 670.

BIOL 850. Advanced Topics in Immunology. (1–2) I, II. Current research in immunology. Pr.: BIOL 670 and consent of instructor.

BIOL 855. Molecular Biology of Cellular Membranes. (3) I. A general coverage of membranes with respect to theories of structure, chemical and physical methods of study, methods of isolation, transport mechanisms, assembly and function of components, and receptors. Some specific membrane systems will be covered in detail including a review of recent references. Pr.: BIOL 541 and BIOCH 521.

BIOL 860. Molecular and Cellular Biology. (3) I, in odd years. A study of the molecular biology of the cell. Regulation, organization, and synthesis of cellular constituents in both prokaryotic and eukaryotic cells will be studied in a comparative manner. Pr.: BIOL 540, BIOCH 765 or equiv.; and consent of instructor.

BIOL 862. Presentations in Ecology. (1) II. A course on presentation of professional seminars which includes instructional information, preparation and delivery of a formal seminar, and critique of seminars.

BIOL 864. Plant Responses to the Environment. (3) I, in odd years. Modern concepts and techniques for measuring the environment and plant ecophysiological responses. Instrument/sensor theory and operation, leaf energy balance, measurement and interpretation of plant carbon and water relations in the field. Pr.: a course in ecology, a course in plant physiology.

BIOL 865. Advanced Plant Ecology. (4) I, in even years. Advanced study of theory in population and community ecology as applied to higher plants. Emphasis on current research in plant population ecology, species interactions, community structure, and succession. Four hours lecture/rec. per week. Pr.: BIOL 430 or a plant ecology course.

BIOL 868. Advanced Cellular and Developmental Biology. (3) I, in odd years. Chemistry, structure, and function of cellular systems in growth, development, and reproduction. Pr.: BIOCH 755 or equiv.

BIOL 870. Advanced Systematic Botany. (4) I, in odd years. Classification, nomenclature, and taxonomic theory of vascular plants. Two hours rec. and six hours lab a week. Pr.: BIOL 551.

BIOL 875. Evolutionary Ecology. (3) I, in even years. A study of the evolution of population, community, and ecosystem structure. Two hours lec. and one hour rec. a week. Pr.: BIOL 529.

BIOL 888. Electron Microscopy Techniques. (3) II. Theory and techniques involved in using the transmission electron microscope for the study of biological materials. Includes individualized instruction on the operation of the Philips 201 electron microscope and techniques for processing biological samples. Pr.: Current participation in research requiring electron microscope and consent of instructor.

BIOL 890. Advanced Topics in Biology. (1–6) I, II, S. Pr.: Consent of instructor.

BIOL 891. Advanced Problems in Biology. (1–8) I, II, S. Pr.: Consent of instructor.

BIOL 895. Graduate Seminar in Biology. (1) I, II. Pr.: Consent of instructor.

BIOL 898. Master's Research in Biology. (1–9) I, II, S.

BIOL 899. Master's Research in Microbiology. (1–9) I, II, S.

BIOL 997. Postdoctoral Research in Biology. (1–12) I, II, S. Advanced-level research in collaboration with a faculty member, involving projects in any area of biology. Pr.: Ph.D. degree or equivalent.

BIOL 998. PhD Research in Biology. (Var.) I, II, S.

BIOL 999. PhD Research in Microbiology. (Var.) I, II, S.

For more information

For additional information and application materials please contact:
Graduate Selection Committee
Division of Biology
Kansas State University
232 Ackert Hall
Manhattan, KS 66506–4901
785-532-6615
Fax: 785-532-6653
Home page: http://www.ksu.edu/biology/

Business Administration

Graduate faculty

David M. Andrus, Ph.D., University of Iowa.
Shih-Fen Chen, Ph.D., University of Illinois.
John Cooney, Ph.D., University of Utah.
Dan Deines, Ph.D., University of Nebraska.
Anand Desai, Ph.D., University of Michigan.
David P. Donnelly, Ph.D., University of Illinois.
Stephen Dukas, Ph.D., Florida State University.
Yar M. Ebadi, DBA, Indiana University.
Stanley W. Elsea, DBA, Indiana University.
Dann Fisher, Ph.D., University of Missouri.
O. Finley Graves, Ph.D., University of Alabama.
Kevin P. Gwinner, Ph.D., Arizonta State University.
Constanza Hagmann, Ph.D., Kansas State University.
Swinder Janda, Ph.D., University of Arkansas.
Christopher Joiner, Ph.D., University of Minnesota.
Jeffrey Katz, Ph.D., University of Florida.
Stacy Kovar, (Associate Member), Ph.D., Oklahoma State University.
Cynthia S. McCahon, Ph.D., Kansas State University.
Roger McHaney, Ph.D., University of Arkansas.
Brian P. Niehoff, Ph.D., Indiana University.
Richard L. Ott, Ph.D., Texas Technical University.
Robert J. Paul, Ph.D., University of Arkansas.
J. Bruce Prince, Ph.D., University of Southern California.
Jeffrey J. Quirin, Ph.D., University of Nebraska.
Chwen Sheu, Ph.D., The Ohio State University.
Diane Swanson, Ph.D., University of Pittsburgh.
Amir Tavakkol, Ph.D., Kansas State University.
Lynn Thomas, Ph.D., University of Kansas.
Philip Trocchia, Ph.D., University of Alabama.
William Turnley, Ph.D., University of South Carolina.
David R. Vruwink, Ph.D., University of Arkansas.

Programs

The master of business administration (MBA) program is designed to provide professional business education to individuals who wish to pursue a variety of administrative careers in both the private and public sectors. The theme of the curriculum is intrapreneurship which can be defined as an "entrepreneurial attitude and approach to management and problem-solving within any organization, large or small." Throughout the program, the focus is "what one needs to know to run a business" while developing the ability to analyze all types of business situations and propose appropriate, creative and financially sound solutions.

The curriculum combines conceptual, analytical and experiential approaches to learning both in and out of the classroom. Once the foundation of basic problem solving tools and knowledge in each functional area is established, the program deepens the interdisciplinary understanding of problem-solving approaches and their functional, ethical, environmental and international ramifications. The program then culminates with a required capstone practicum. This practicum makes the K-State MBA unique in the area, by provid-

ing an interdisciplinary, team-based consulting-type of experience for all students in their last semester of study.

The MBA curriculum is a 52 credit hour program designed to be completed in two years of full-time study or four years of part-time, typically evening, study. Four components comprise the curriculum: the business core (24 credit hours), the advanced core (12 credit hours), the integration core (7 credit hours) and the set of electives (9 credit hours). The student may choose to pursue a prespecified, focused concentration in lieu of the set of electives. Students pursuing a master's degree in another field may choose to use 9 credit hours from their other master's as the set of electives in the MBA. Thus, a dual master's/MBA can be obtained with an additional 43 credit hours. The integrated core will be composed of a three credit hour theory component with a four credit hour practicum component. The full time program of study will allow an undergraduate business major to obtain the MBA in 17 months, if begun in the spring semester.

Before beginning the MBA course work, students must acquire basic competency in the following areas: oral and written communication, mathematical analysis, personal computing, and economic theory and analysis. These competencies may be acquired through specific undergraduate course work with the number of courses required depending on the applicant's prior academic work. This basic competency coursework may be taken after admission to the MBA program during the student's first semester. Once admitted, MBA students are responsible for making themselves aware of Graduate School policies and deadlines.

Curriculum prerequisite courses:
Any English class
Any speech class
CIS 101, 102, 103: Introduction to PCs, Spreadsheets and Databases, respectively
MATH 205: General Calculus and Linear Algebra
Six hours of economics (ECON 520—Intermediate Microeconomics preferred)

Curriculum components:
(for course descriptions, please see the respective departmental listings)

Business core
24 credit hours; may waive 6-12 credit hours if "B" or better is achieved in the listed undergraduate courses (or equivalent courses from AACSB accredited institutions); learning activities are structured using the knowledge, comprehension, application, and analysis levels of Bloom's Taxonomy.

ACCTG 810	Accounting Concepts and Analysis (3) Fall; (waived if credit in ACCTG 231 and ACCTG 241)
ECON 815	Economic Analysis for Business (3) Spring
FINAN 815	Managerial Finance I (3) Spring; prerequisite: ACCTG 810; (waived if credit in FINAN 450 and FINAN 551)
MANGT 820	Behavioral Management Theory (3) Fall; (waived if credit in MANGT 520 and MANGT 531)
MANGT 810	Operations Management and Analysis (3) Spring; prerequisite: STAT 702; (waived if credit in MANGT 421 and MANGT 521)
MANGT 830	Applied Managerial Computing (3) Fall
MKTIB 810	Marketing Concepts and Research (3) Spring; (waived if credit in MKTIB 400 and MKTIB 640)
STAT 702	Statistical Methods for Social Scientists (3) Fall and spring; (waived if credit in STAT 350 and STAT 351)

Advanced core
12 credit hours; the prerequisite for each of these courses is the successful completion of all of the curriculum prerequisites and the business core courses; learning activities are structured using the application, analysis, and synthesis levels of Bloom's Taxonomy.

ACCTG 860	Management Accounting and Business Problem Solving (3) Fall
FINAN 860	Managerial Finance II (3) Fall
MANGT 860	Management of Legal, Ethical and Public Policy Issues (3) Fall
MKTIB 860	Advanced International Business (3) Fall

Integrated core
7 credit hours; the prerequisite for each of these courses is successful completion of all the advanced core courses; GENBA 890 will be team planned and taught with graduate faculty from each of the four departmental/functional areas; learning activities are structured using the analysis, synthesis, and evaluation levels of Bloom's Taxonomy.

GENBA 880	Business Strategy (3) Spring
GENBA 890	Business Practicum (4) Spring

Electives/concentration
9 credit hours; with at least one 800-level course, with the remainder to be composed of 600-level (and above) courses from any college, with the approval from the student's advisory committee. A limited number of business concentrations will be available.

Total credit hours: 52

Typical course of study

Fall semester I
ACCTG 810
MANGT 820
MANGT 830
STAT 702
(12 cr hrs)

Spring semester I
ECON 815
FINAN 815
MANGT 810
MKTIB 810
(12 cr hrs)

Summer semester I
Elective #1
(3 cr hrs)

Fall semester II
ACCTG 860
FINAN 860
MANGT 860
MKTIB 860
(12 cr hrs)

Spring semester II
GENBA 880
GENBA 890
Elective #2
Elective #3
(13 cr hrs)

Accreditation

Kansas State University's College of Business Administration is accredited by the International Association for Management Education (AACSB) at both the undergraduate and graduate levels.

The AACSB is an international organization that requires that its members maintain high educational standards. The AACSB is recognized as the sole accrediting agency for baccalaureate and master's degree programs in business administration by the U.S. Office of Education and the Council on Post-Secondary Accreditation. Members of the organization have established high standards for the professional achievement of the faculty, their teaching effectiveness and research productivity, proper balance in the curriculum, and effective student job placement. AACSB-accredited programs meet the rigorous standards of quality set by the organization. Only 20 percent of the approximately 1,300 colleges of business administration in the United States are accredited by the AACSB. The Department of Accounting became the first in Kansas to receive accreditation by the AACSB for both undergraduate and graduate programs. Approximately 50 graduate accounting programs are accredited in the United States, which places the master of accountancy program among the top in the nation.

Area of concentration

K-State's MBA offers its students the opportunity to gain general business knowledge as well as develop a focus in a particular area of interest. Concentration areas are available in agribusiness, finance, international business, management, and marketing. Specific courses have been carefully developed to complement one another and best meet the needs of our students. Students wishing to complete specific concentrations will be restricted to designated course work. MBA students may not take a concentration in accounting. Students interested in accounting should enroll in the master of accountancy (MAcc) program.

Agribusiness
Agribusiness is the study of the economics and management of agribusiness firms with attention given to the aspects unique to agribusiness. Some of those aspects are the risks and uncertainties of agricultural production, the heavy reliance on natural resources, the uniqueness of the institutions that govern food and agriculture, the competitive structures within the agribusiness sector, the technology of commercial agriculture and food processing, and the international dimensions of food and agriculture.

Finance
The finance concentration will allow students to combine the broad MBA education with specific skills necessary to be a successful financial manager. These students will specialize in controlling the resource investments required to support an enterprise's operating activities, planning and negotiating appropriate financing arrangements to support these investment requirements, and managing the risks inherent in an enterprise's investment and financing activities.

International business
The international studies concentration will promote in-depth understanding of the international community and its characteristics. K-State's program is best suited to those students who have acquired some background knowledge on a country other than the United States and who are proficient in a modern foreign language. Students will explore general business concepts as they relate specifically to the international arena.

Management
The management concentration offers courses to develop integrative skills as well as top management skills in corporate strategy and institutional leadership. This background provides individuals with excellent opportunities for rapid advancement in management careers. Concentration courses can be chosen from broad management areas including operations management, human resources, and computer usage in business.

Marketing
Students who choose an emphasis in marketing will be skilled in a wide range of opportunities including consumer behavior, international marketing, marketing strategy, and marketing research. This diversity allows students to develop sufficient expertise to promote quickly to upper marketing positions.

Application requirements
A complete application file must be received in the College of Business Administration Graduate Studies Office before the deadlines indicated below in order to be considered for admission. Requests for financial aid applications (assistantships, scholarships, and/or fellowships) should be communicated directly to the director of graduate studies using the above address and telephone number or the email address below. The following items constitute a complete application:

- completed application for admission to Graduate School
- non-refundable application fee of $45
- official record of your GMAT score sent directly from Educational Testing Service (ETS)
- two official copies of your transcript(s) from all universities attended
- three letters of recommendation from former professors or employers (reference form for graduate study preferred)
- one page statement of objectives in pursuing the program
- official record of your TOEFL score sent directly from ETS (for applicants whose native language is not English)
- completed affidavit of financial support dated *within six months of desired entry date* (for international applicants only) Note: Substitute documentation other than the Affidavit cannot be accepted

Deadlines

International applications		Domestic applications	
Fall:	March 1	Fall	July 15
Spring:	September 1	Spring	December 1

Deadlines for international/domestic applications with requests for financial aid
- Fall semester: March 1
- Spring semester: November 1

Assistantships
Many graduate teaching and research assistantships are available each year. Assistantships vary between two-tenths and four-tenths time (40-hour per week basis) for the nine-month academic year. The amount of such stipends is reviewed annually. Some assistantships also carry a partial tuition waiver. A student on a four-tenths time appointment may not carry more than 12 credit hours per semester.

In recent years, graduate assistants have performed research with professors, advised undergraduate students, proctored exams, and assisted in the college's computer laboratory. An applicant interested in obtaining an assistantship should request an application form from the director of graduate studies. When possible, all assistantship positions will be granted immediately following the application deadlines.

Financial assistance
For inquiries concerning forms of financial assistance other than graduate assistantships, fellowships, or college scholarships, write to:
Student Financial Assistance
Kansas State University
104 Fairchild Hall
Manhattan, KS 66506–1104
785-532-6420

For specific information about graduate assistantships, fellowships, or College of Business Administration scholarships, contact the director of graduate studies.

General business courses
GENBA 880. Business Strategy. (3) II. Through case analysis, a study of the functions, responsibilities, and point of view of general management and the problems which affect the total organization's characters and success. The formulation and application of corporate and business strategies, specifically, analysis of interrelationships between the external and internal environments, choice of purpose, molding of organizational character, definition of what needs to be done, and motivation of resources for goal attainment. Pr.: ACCTG 860, FINAN 860, MANGT 860 and MKTIB 860.

GENBA 890. Business Practicum. (4) II. The analysis of business problems, using knowledge and tools from previous courses. Students, under the supervision of a team of faculty, will analyze actual business case problems. Pr.: ACCTG 860, FINAN 860, MANGT 860 and MKTIB 860.

For more information
For additional information and application materials please contact:
Cynthia S. McCahon, Assistant Dean
Director of Graduate Studies
College of Business Administration
110 Calvin Hall
Manhattan, KS 66506–0501
785-532-7190
Fax: 785-532-7024
E-mail: flynn@ksu.edu
Home page: http://www.cba.ksu.edu/cba/

Chemical Engineering

Head
Stevin H. Gehrke

Director of graduate studies
James H. Edgar

Graduate faculty
Richard G. Akins, Ph.D., Northwestern University.
James H. Edgar, Ph.D., University of Florida.
Larry E. Erickson, Ph.D., Kansas State University.
L. T. Fan, Ph.D., West Virginia University.
Stevin H. Gehrke, Ph.D., University of Minnesota.
Larry A. Glasgow, Ph.D., University of Missouri.
Benjamin G. Kyle, Emeritus, Ph.D., University of Florida.
John C. Matthews, Emeritus, D.Sc., Washington University.
John R. Schlup, Ph.D., California Institute of Technology.
Walter P. Walawender Jr., Ph.D., Syracuse University.

Program description
The department offers M.S. and Ph.D. programs in chemical engineering and in interdisciplinary areas of systems engineering, food science, environmental engineering, and materials science.

Areas of study and research include transport phenomena, biomass conversion, thermodynamics and phase equilibrium, molecular dynamics simulation, polymer networks and gels, controlled drug delivery, artificial protein biosynthesis, biochemical engineering, process dynamics and control, chemical reaction engineering, intelligent processing of materials, chemical vapor deposition of electronic materials, bulk crystal growth, nanotechnology, process system engineering, fluidization, environmental pollution control, and activated carbons.

For more information about the Ph.D. program, see the Engineering section of this catalog.

Research facilities

The Department of Chemical Engineering has well-equipped research laboratories for transport phenomena, thermodynamics, environmental pollution control, materials science and engineering, chemical reaction engineering, biochemical engineering, particle dynamics, energy resources conversion, and natural convection. Specialized instrumental capabilities include interferometry, laser-Doppler velocimetry, high-speed videography, Fourier-transform infrared spectrometry, scanning electron microscopy, dynamic mechanical analysis, gas adsorption analysis, chemical vapor deposition, atomic force microscopy, and ultra-high temperature furnaces.

The department also houses the Institute for Systems Design and Optimization, where several artificial intelligence work stations are located for research in process design and synthesis, and process control.

Program requirements

The Ph.D. degree requires 90 credit hours. This is divided in approximate thirds for major course work, minor subjects, and research work. A diversified and flexible choice of minor subjects and a good selection of research topics are available. Qualified students may bypass the master's degree and work directly toward the Ph.D. degree.

An M.S. degree requires 30 credit hours, and can be earned with either the thesis or report options. In the thesis option, 24 hours of course work and 6 hours of thesis are required. The thesis is based on directed research performed by the student. In the report option, 27 hours of course work and 3 hours of report are required. The report is based on a literature review or design project performed by the student.

Admission procedures

Highly motivated students interested in the research activities of the department are encouraged to apply. All applicants must submit a completed application form, official copies of their undergraduate transcripts, and 3 letters of recommendation to the department. International applicants must also submit GRE and TOEFL scores, and the application fee.

Financial support

Graduate research assistantships and industrial fellowships are available to qualified students. Several offer stipends up to $17,000 and some include waiver of tuition and fees. Work can be used toward thesis credit. Supplemental industrial grants also are offered to outstanding candidates.

Chemical engineering courses

Undergraduate and graduate credit in minor field

CHE 516. Chemical Engineering Computational Techniques II. (1) I. Application of digital computers to chemical engineering problems. Three hours of lab a week. Pr.: CHE 316 or conc.: CHE 550 and 560.

CHE 520. Chemical Engineering Thermodynamics I. (2) I. A study of the first and second laws of thermodynamics, real gases, heat of solution and reaction. Two hours rec. a week. Pr.: CHE 320. Pr. or conc.: CHM 585.

CHE 521. Chemical Engineering Thermodynamics II. (3) II. A continuation of the study of the second law, thermodynamic analysis of processes, phase equilibrium, chemical reaction equilibrium. Three hours rec. a week. Pr.: CHE 520.

CHE 522. Chemical Engineering Laboratory I. (2) II. Laboratory experiments on momentum and heat transfer. Five hours lab a week. Pr.: CHE 520 and 530.

CHE 530. Transport Phenomena I. (3) I. A unified treatment of the basic principles of momentum, energy, and mass transport. Three hours rec. a week. Pr.: CHE 320 and MATH 240.

CHE 531. Transport Phenomena II. (3) II. Continuation of Transport Phenomena I with special emphasis on mass transfer. Three hours rec. a week. Pr.: CHE 530.

CHE 532. Chemical Engineering Laboratory II. (2) I. Laboratory experiments on heat and mass transfer. Five hours lab a week. Pr.: CHE 521 and 531.

CHE 542. Chemical Engineering Laboratory III. (3) II. Laboratory experiments on classical unit operations, e.g., distillation, absorption, extraction, and on chemical kinetics and process dynamics. Eight hours lab a week. Pr.: CHE 516, 550 and 560. Pr. or conc.: CHE 561.

CHE 550. Chemical Reaction Engineering. (3) I. Applied chemical kinetics and catalysis including the analysis and design of tubular, packed bed, stirred tank, and fluidized bed chemical reactors. Three hours rec. a week. Pr.: CHE 521 and 531. Conc.: CHE 516.

CHE 560. Separational Process Design. (3) I. Development of the basic theory and design of separational processes such as distillation, gas absorption, liquid extraction, adsorption, and ion exchange. Three hours rec. a week. Pr.: CHE 521 and 531. Conc.: CHE 516.

CHE 561. Chemical Process Dynamics and Control. (3) II. A study of the unsteady state behavior and control of chemical processes. Three hours rec. a week. Pr.: CHE 550.

CHE 570. Chemical Engineering Systems Design I. (2) I. Basic concepts of process economics with application to the design of chemical processes. Two hours rec. a week. Pr. or conc.: CHE 550 and 560.

CHE 571. Chemical Engineering Systems Design II. (4) II. Basic concepts of process optimization with application to the synthesis and design of chemical processing systems. Emphasis will be on the solution of comprehensive systems design problems. Two hours rec. and six hours lab a week. Pr.: CHE 516, 550, 560, and 570. Pr. or conc.: CHE 561.

CHE 580. Problems in Chemical Engineering or Materials Science. (Var.) I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head.

Undergraduate and graduate credit

CHE 626. Bioseparations. (2) II, in even years. Study of separations important in food and biochemical engineering such as leaching, extraction, expression, absorption, ion exchange, filtration, centrifugation, membrane separation, and chromatographic separations. Two hours rec. a week. Pr.: CHE 531 or BAE 575.

CHE 648. Processing of Composite Materials. (3) I, II. Principles of composite materials, including ceramic, metal, and polymer matrix composites; properties and processing of fibers; role of interfaces in composites; basic concepts in mechanics, failure, and testing of composite materials. Three hours lec. a week. Pr.: CHE 350 or 352.

CHE 650. Hazardous Waste Engineering Seminar. (1) I, II, S. Topics in hazardous materials management and control, waste reduction and minimization, hazardous substance tracking, and hazardous waste engineering. One hour rec. a week. Pr.: CHM 230.

CHE 653. Ceramic Materials. (3) I, II. Structure and bonding in glasses and ceramics; phase equilibria and transformation kinetics; defects and microstructure within ceramic materials; mechanical, thermal, optical, electrical, and magnetic properties of ceramics and glasses. Three hours rec. a week. Pr.: CHE 350 or 352.

CHE 661. Processing of Materials for Solid State Devices. (3) I, II. Structure, properties and processing of materials for solid state devices. Crystal growth, epitaxy, oxidation, diffusion, lithography, and etching as applied to device fabrication. Three hours rec. a week. Pr.: CHE 350 or 352.

CHE 664. Electrochemical Engineering. (3) I, II. Thermodynamics, electrode kinetics, and transport phenomena of electrochemical systems. Three hours rec. a week. Pr.: CHE 521 and 531.

CHE 681. Engineering Materials II. (3) I, II, S. The structure and bonding in crystalline and amorphous materials; crystallography; thermodynamic stability in materials; equilibrium diagrams and the phase rule; rate theory and kinetics of solid-state transformations; mechanical behavior of engineering materials; dislocations; failure mechanisms. Three hours lec. a week. Pr.: CHE 350 or 352.

CHE 682. Surface Phenomena. (2) I, II, S. Principles and application of interfacial phenomena, including capillarity, colloids, porosity, adsorption, and catalysis. Two hours rec. a week. Pr.: CHE 520.

CHE 715. Biochemical Engineering. (3) I. The analysis and design of biochemical processing systems with emphasis on fermentation kinetics, continuous fermentations, aeration, agitation, scale up, sterilization, and control. Three hours rec. a week. Pr. or conc.: CHE 550.

CHE 725. Biotransport Phenomena. (3) I, II. Principles of transport phenomena applied to biological and physiological processes. Membrane transport processes, circulatory system transport phenomena, transport and distribution of drugs. Pr.: CHE 530.

CHE 735. Chemical Engineering Analysis I. (3) I, II, S. The mathematical formulation of problems in chemical engineering using partial differential equations, vector and tensor notation. Solution of these problems by analytical and numerical. Three hours rec. a week. Pr.: CHE 530.

CHE 745. Analysis of Physiological Processes. (3) II. Principles of process and systems analysis applied to problems in biology and medicine. Analysis of mixing in-flow systems, principles and applications of tracer analysis, analysis of kinetic and adsorption processes. Pr.: CHE 550.

CHE 750. Air Quality Seminar. (1) I. Topics in air quality including health effects, toxicology, measurement, characterization, modeling, management, and control. One hour recitation a week. Pr.: CHEM 230.

Graduate credit

CHE 802. Selected Topics in Materials Science. (Var.) I, II, S. Areas of current interest in materials including solidification, transformations, solutions, dislocations, creep, fracture, failure analysis, and failure prevention. Pr.: CHE 681.

CHE 805. Selected Topics in Biochemical Engineering. (3) II, S. Subjects of current interest in the broadest sense of biochemical engineering. These involve not only chemical engineering problems which contain biochemical biological, or medical elements but also applications of chemical engineering principles and methodologies to biochemical, biological, medical, and ecological problems. Pr.: CHE 715.

CHE 810. Research in Chemical Engineering. (Var.) I, II, S. Original investigations in transport phenomena, unit operations, thermodynamics, process dynamics, applied chemical kinetics and process development. The results of these investigations may be used for the master's thesis or the doctoral dissertation.

CHE 815. Advanced Chemical Engineering Thermodynamics. (3) I, II, S. Advanced topics in thermodynamics, with emphasis on a chemical and physical equilibria and the estimation of thermodynamic properties. Three hours rec. a week, Pr.: Graduate standing in chemical engineering.

CHE 822. Advanced Chemical Reaction Engineering. (3) I, II, S. Theory of kinetics and catalysis in homogeneous and heterogeneous systems, with applications in chemical reactor design and process development. Three hours rec. a week. Pr.: CHE 550.

CHE 826. Advanced Unit Operations I. (3) I, II, S. Advanced study of mass transfer operations. Three hours rec. a week. Pr.: CHE 560.

CHE 832. Advanced Unit Operations II. (3) I, II, S. Advanced study of the operations involving mechanical separation of materials. Three hours rec. a week. Pr.: CHE 560.

CHE 850. Advanced Chemical Process Dynamics. (3) I, II, S. The dynamical behavior of chemical reaction systems and process equipment used in chemical plants. Control mechanisms for these systems. Three hours rec. a week. Pr.: Graduate standing in chemical engineering.

CHE 862. Advanced Transport Phenomena I. (3) I, II, S. Advanced treatment of momentum, energy, and mass transport, with emphasis on momentum transport in chemical engineering applications. Three hours rec. a week. Pr.: CHE 735.

CHE 867. Advanced Transport Phenomena II. (3) I, II, S. Advanced treatment of momentum, energy, and mass transport, with emphasis on energy and mass transport in chemical engineering applications. Three hours rec. a week. Pr.: CHE 862.

CHE 871. Advanced Process Design and Optimization. (3) I, II, S. Advanced problems in the optimal design and economic evaluation of plant equipment and processes for the chemical and allied industries. Three hours rec. a week. Pr.: CHE 571 and 735.

CHE 875. Graduate Seminar in Chemical Engineering. (1) I, II. Discussion of current advances and research in chemical engineering and related fields.

CHE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of department head and major professor.

CHE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of department head and major professor.

CHE 901. Selected Topics in Reaction Engineering. (3) I, II, S. Advanced study in this field of such topics as complex reactions, catalysis, dispersion effects, fast reactions, reactions in fluidized beds. Three hours rec. a week. Pr.: CHE 822 and one course in chemical engineering numbered 851 or higher.

CHE 906. Selected Topics in Semiconductor Processing. (Var.) I, II, S. Areas of current interest in semiconductor processing including solid state diffusion, plasma-assisted deposition and etching, thin film deposition processes, contamination control, and contact metallurgy. Pr.: CHE 661 and CHE 815.

CHE 910. Selected Topics in Transport Phenomena. (3) I, II, S. Subjects of current interest such as surface phenomena, turbulent transport, droplet mechanics, multicomponent systems. Three hours rec. a week. Pr.: CHE 867.

CHE 915. Selected Topics in Process Dynamics. (3) I, II, S. Study of the most recent methods for analysis of the dynamic behavior and control of complex systems and industrial processes. The use of Lyapunov theorems and the maximum principle are examples of the methods to be studied. Three hours rec. a week. Pr.: CHE 850 and one graduate course in chemical engineering numbered 851 or higher.

CHE 920. Selected Topics in Unit Operations. (3) I, II, S. Study of such topics as zone melting, foam fractionation, membrane permeation, thermal diffusion, and unsteady state operations. Three hours rec. a week. Pr.: CHE 826 or 832 and one course in chemical engineering numbered 851 or higher.

CHE 925. Selected Topics in Process Design and Optimization. (3) I, II, S. Study of advanced methods of process design and optimization, such as modern variational methods and dynamic programming. Applications to be chosen mainly from the chemical and allied industries to include stochastic as well as deterministic problems. Three hours rec. a week. Pr.: CHE 871.

CHE 930. Selected Topics in Thermodynamics. (3) I, II, S. Advanced study in this field of such topics as irreversible thermodynamics, solution theory, and surface phenomena. Three hours rec. a week. Pr.: CHE 815 and one course in chemical engineering numbered 851 or higher.

CHE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of department head and major professor.

For more information

For additional information and application materials please contact:
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Chemistry

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Paul W. Baures, Ph.D., University of Minnesota.

Keith R. Buszek, Ph.D., University of California, Los Angeles.

Maryanne M. Collinson, Ph.D., North Carolina State University.

Robert M. Hammaker, Ph.D., Northwestern University.

M. Dale Hawley, Ph.D., University of Kansas.

Daniel A. Higgins, Ph.D., University of Wisconsin–Madison.

Mark D. Hollingsworth, Ph.D., Yale University.

Duy H. Hua, Ph.D., Southern Illinois University at Carbondale.

Anne Myers Kelley, Ph.D., University of California, Berkeley.

David F. Kelley, Ph.D., University of Washington.

Kenneth J. Klabunde, Ph.D., University of Iowa.

Eric A. Maatta, Ph.D., Indiana University.

Pedro L. Muiño, Ph.D., Montana State University.

J. Vincent Ortiz, Ph.D., University of Florida.

Donald W. Setser, Ph.D., University of Washington.

Peter M. A. Sherwood, Ph.D., Sc.D., Cambridge University.

Christopher M. Sorensen, Ph.D., University of Colorado.

Ralf Warmuth, Ph.D., Johann Wolfgang Goethe-University, Frankfurt am Main.

Facilities

Kansas State University is committed to providing its students and faculty with an excellent and stimulating atmosphere in which to conduct research. This commitment is reflected by the over $2 million of new instrumentation added to the department in recent years and by the construction of our new Chemistry-Biochemistry building. As a medium-sized chemistry department, K-State is large enough to ensure that our students are provided access to a variety of first-rate equipment, yet small enough to assure our students of a close personal interaction with faculty. We recognize that our students are individuals, and our programs are structured so as to allow each student to reach his or her potential at an appropriate pace.

The department possesses a full complement of first-rate instrumentation ranging from the familiar and routine to the complex and highly specialized. It is the policy of the department to provide our students with unrestricted access to our instruments and to provide instruction to become proficient in their use. The departmental surface science facility contains three X-ray photoelectron spectrometers, Auger, UPS and SIMS capabilities, and a full range of sample preparation techniques are used, including argon ion etching, and sample fracture. A special chamber for anaerobic electrochemical surface studies is also available. An electron microprobe has energy and wavelength X-ray mapping as well as SEM capabilities. Also available are an X-ray powder diffraction spectrometer, a scanning tunneling microscope (STM) and atomic force microscope (AFM), and a transmission electron microscope (TEM). Recent additions include single-crystal X-ray diffractometers including CCD detection, an optical microscope, a near-field scanning optical microscope (NSOM), an electrochemical NSOM, a Fourier transform microwave spectrometer, and a Fourier transform ion cyclotron resonance mass spectrometer (FTMS).

The department possesses outstanding capabilities in the area of molecular spectroscopy. The NMR laboratory features Varian Unity +400, Unity +500, and Gemini 2000 spectrometers, which provide easy data acquisition and excellent resolution and sensitivity for any 1-D or 2-D or 3-D spectra. In addition, Fourier transform infrared (FT-IR) spectroscopic facilities are available as well as a gas chromatography/mass spectrometry (GC/MS) capability. Computer systems pervade the department, ranging from personal computers to Sun, IBM, and SGI workstations, and access to the university mainframe and off-campus networks is readily available. All of these instruments and facilities are housed in a complex of three buildings, including our new Chemistry-Biochemistry building, which has been designed to accommodate all aspects of modern chemical research and teaching with a primary emphasis on safety. Outstanding glassblowing, machine, and electronics shops offer expert fabrication of specialized equipment, and a well-provisioned chemistry storeroom main-

tains a large inventory of research chemicals and equipment.

Programs of study

The Department of Chemistry offers programs leading to the M.S. and Ph.D. degrees in analytical, biological, inorganic, materials, organic, and physical chemistry. Strong interdisciplinary programs at the Ph.D. level are also offered through the Center for Materials Research, which comprises research efforts of faculty from the departments of chemistry; physics; chemical engineering; mechanical and nuclear engineering; and electrical and computer engineering.

Entering students are administered placement exams in the analytical and physical chemistry areas in order to assess their preparations for graduate studies. Outstanding students are encouraged to take advanced standing exams that allow course work to be bypassed. A minimum grade of C must be obtained in all courses in order to earn credit and a minimum overall grade point average of 3.0 (out of a possible 4.0) is necessary. Original research is the most important part of the graduate program, and selection of a research director is made during the first semester in residence in order to allow students to start work on their research projects at an early date.

Ph.D. degree

A program of study will include at least 30 hours of graduate course work, including courses from the four areas: 3 hours at the 700 level or higher from the analytical area; CHM 711 or 712 from the inorganic area, Advanced Organic Chemistry, and Theoretical Chemistry 1; and 2 hours of credit in the graduate seminar appropriate to the major area. A total of 90 semester hours is required, including at least 50 hours of research for students entering with a bachelor's degree and 36 hours for students entering with a master's degree.

The preliminary exam for the Ph.D. degree consists of a series of written cumulative exams beginning in the second or third semester of residence on topics within the student's area of specialization, and an oral research proposition examination that the student must prepare and defend before his or her supervisory committee by the end of the third year or the middle of the fourth year. Completion of the Ph.D. degree requires the submission of a written dissertation and its oral defense before one's supervisory committee.

M.S. degree

A minimum of 30 semester hours of graduate credit is required for this degree program, of which no less than 22 hours will be earned in course work. The program of study for the master's degree will normally include up to 15 hours in the student's major area of study, 6 to 12 hours in related areas, and one hour of graduate seminar. At least two semester hours of credit must be earned at the 700 level or higher in each of three of the following areas of study: analytical, inorganic, organic, and physical chemistry. A master's thesis that is based on 6 to 8 semester hours of original research must also be defended before one's supervisory committee.

Admission to advanced degrees

Undergraduate transcripts are required as are letters of recommendation from persons familiar with your chemistry background. Applicants are strongly encouraged to take the GRE, including both the general test and the subject test in chemistry. Students considering graduate work at Kansas State University are encouraged to visit the department, to meet with members of the faculty and with other students, and to observe our facilities and educational environment.

We welcome applications from well-qualified international students. Two requirements must be satisfied in order to demonstrate proficiency in English: a score of 550 or higher on the TOEFL and a score of 50 or higher on the TSE. International applicants must also submit the results of the Graduate Record Examinations, including the chemistry subject test.

Financial support

Most graduate students are supported for the duration of their studies by various teaching assistantships, research assistantships, and fellowships. Incoming students are generally awarded teaching assistantships; summer support also is provided if performance in course work and teaching duties during the academic year is satisfactory. Students with excellent undergraduate credentials frequently receive supplemental departmental fellowships and are considered for graduate fellowships on a university-wide competitive basis. Outstanding graduate students are recognized annually through teaching and research awards.

General chemistry courses

Undergraduate and graduate credit in minor field

CHM 599. Undergraduate research. (1, 2, 3) I, II, S. Analytical, inorganic, organic, or physical chemistry. A final, formal written report is required.

Undergraduate and graduate credit

Unless otherwise stated, all chemistry courses numbers 600 or above require the following as minimum prerequisites: CHM 550 Organic Chemistry II; CHM 532 Organic Chemistry Laboratory; CHM 595 Physical Chemistry II; and CHM 598 Physical Chemistry II Laboratory.

CHM 600. Scientific Glassblowing. (1) II. The basic techniques of bending, sealing, and blowing glass used to fabricate scientific glassware. Three hours of laboratory including one lecture demonstration a week. Pr.: Senior or graduate standing in physical sciences.

CHM 601. Safe Chemical Laboratory Practices. (1) I. A general safety course for persons working or teaching in a chemical laboratory. One hour of lecture per week. Pr.: CHM 371 and 350 or equivalents.

CHM 700. Practicum in Teaching Chemistry. (1) I. Principles and methods of instruction in laboratories and recitation classes in chemistry, including one semester of supervised experience as an instructor in a chemical laboratory. This is a required course of all teaching assistants in the Department of Chemistry. May be taken only once for credit. Pr.: Senior standing in chemistry.

CHM 799. Problems in Chemistry. (Var.) I, II, S. Problems may include classroom or laboratory work. Not for thesis research. Pr.: Consent of instructor.

Graduate credit

CHM 899. Research in Chemistry. (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry for the M.S. degree.

CHM 999. Research in Chemistry. (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry for the Ph.D. degree.

Analytical chemistry courses

Undergraduate and graduate credit in minor field

CHM 545. Chemical Separations. (2) II. Principles of modern separation techniques. One hour. lec. and three hours lab a week. Pr.: CHM 250 or 371, or both CHM 532 and CHM 550.

CHM 566. Instrumental Methods of Analysis. (3) I. Introduction to theory and practice of electrochemical methods, molecular and atomic spectroscopy, surface science, mass spectrometry, separation methods, and electronics in analytical chemistry. Three hours lec. a week. Pr.: CHM 550, PHYS 114 or 214, and MATH 221.

CHM 567. Instrumental Methods of Analysis Laboratory. (1) I. Three hours lab a week. Pr.: CHM 566 or conc. enrollment.

Undergraduate and graduate credit

CHM 725. Instrumentation in Chemistry. (3) On sufficient demand. Theory and practice of instrument design for use in chemical research. Study of the flow of energy and information in systems for measurement and control. Two hours lec. and three hours lab a week. Pr.: CHM 566 or consent of instructor.

Graduate credit

CHM 901. Graduate Seminar in Analytical Chemistry. (0–1) I, II, S.

CHM 921. Advanced Separations. (2) I, in even years. Two hours lec. a week.

CHM 922. Advanced Separations Laboratory. (1) I, in even years. Three hours lab a week.

CHM 937. Applications of Surface Science to Chemistry. (3) II, in even years. Chemical bonding in the solid state. Surface science and related techniques as applied to chemical problems. Special topics including data analysis and corrosion studies.

CHM 940. Chemical Microscopy. (3) II, in even years. The theory, instrumentation, and application of modern microscopic methods are covered in this lecture course. Emphasis is given to the study of chemically-important phenomena in material systems.

CHM 942. Advanced Analytical Chemistry. (3) I, in odd years. Elemental and functional group analyses, nonaqueous solvent systems, gas analysis, kinetics, and thermal methods of analysis.

CHM 944. Electroanalytical Chemistry. (2–3) II, in odd years. Theory and applications of electrochemical methods; chronoamperometry, chronopotentiometry, cyclic voltammetry, coulometry, polarography, potentiometry, and instrumentation.

CHM 946. Principles and Techniques of Analytical Chemistry. (1–5) II, in odd-numbered years. A lecture and

laboratory course on emission spectroscopy, flame photometry, atomic absorption, and x-ray methods.

CHM 947. Applied Molecular Spectroscopy. (3) II, in odd-numbered years. Experimental, and theoretical methods associated with ultraviolet and visible absorption, fluorescence, Raman scattering, and nonlinear optical spectroscopies. Pr.: CHM 854.

CHM 948. Computer Control of Chemical Instruments. (3) The technique and use of a minicomputer in the laboratory, including interface hardware and software for digital and analog data acquisition and display and instrument control. Two hours lec. and three hours lab a week. Pr.: CHM 725.

Inorganic chemistry courses

Undergraduate and graduate credit

CHM 650. History of Chemistry. (2) II, in even years. Traces the beginnings of chemistry from 3500 B.C. to 1920 A.D. Early metallurgy, Greek thought about atoms, alchemy, atomic theory, discovery of gases; definition of elements, chemical bonds, organic, inorganic, and physical chemistry. Pr.: CHM 585.

CHM 657. Inorganic Techniques. (1–2) II. The preparation, characterization, and study of transition metal, main group, and organometallic compounds of unusual interest, using techniques commonly encountered in industrial and academic research. Six hours lab a week. Pr.: CHM 585.

CHM 711. Inorganic Chemistry I. (3) I. Atomic and molecular structure, bonding concepts used in the practice of inorganic chemistry. Applications of symmetry and group theory to structure, bonding, and spectra. Three hours lec. a week. Pr.: CHM 550, 595.

CHM 712. Inorganic Chemistry II. (3) II. Structure, reactivity, and mechanistic aspects of main group and transition metal complexes. Organometallic reactions, catalysis, and bioinorganic chemistry. Three hours lec. a week. Pr.: CHM 550, 595.

Graduate credit

CHM 800. Chemistry in Outer Space and in the Laboratory. (2) II, in odd years. The generation of reactive atoms and molecules in outer space and in the laboratory is covered, as well as their chemical reactions and spectroscopy. Extreme conditions of high and low temperatures, synthesis using atoms, nanoscale particles of inorganic materials, and matrix isolation are discussed. Pr.: CHM 712.

CHM 902. Graduate Seminar in Inorganic Chemistry. (0–1) I, II, S.

CHM 929. Physical Methods in Inorganic Chemistry. (3) II. Theory and application of infrared, Raman, visible, ultraviolet, NMR, ESR, NQR, Mossbauer, and mass spectrometry to inorganic chemistry. Three hours lec. a week. Pr.: CHM 711.

CHM 930. Homogeneous Catalysis. (2) II, in even years. The study of industrially important and synthetically useful catalysis of organic reactions by soluble metal complexes. Two hours lec. a week. Pr.: CHM 712 or consent of instructor.

CHM 935. Selected Topics in Inorganic Chemistry. (1–3) I, II. A lecture course in inorganic chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once. Pr.: Consent of instructor.

CHM 936. Electronic Structure of Molecules and Solids. (2) I, in even years. Electronic structure calculations and interpretations of results using the instructor's software. Pr.: CHM 711.

Organic chemistry courses

Undergraduate and graduate credit in minor field

CHM 531. Organic Chemistry I. (3) I, II. General principles of organic chemistry; study of the main types of aliphatic compounds, with an introduction to fats, carbohydrates, amino acids, proteins, and aromatic compounds. Required for the chemistry curricula and for entrance to medical schools. Three hours lec. a week. Pr.: CHM 230 or 250.

CHM 532. Organic Chemistry Laboratory. (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 550 or conc. enrollment.

CHM 550. Organic Chemistry II. (3) I, II. Continuation of CHM 531, including additional aromatic chemistry, condensation reactions, and introduction to some advanced topics, such as dyes, polymers, and heterocyclic chemistry. Three hours lec. a week. Pr.: CHM 531.

CHM 551. Advanced Organic Laboratory. (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 550 and CHM 532.

Undergraduate and graduate credit

CHM 752. Advanced Organic Chemistry. (3). I. Advanced study of organic compounds and fundamental types of reactions. Three hours lec. a week. Pr.: CHM 550 and 595.

Graduate credit

CHM 860. Synthetic Organic Chemistry. (4) II. Conditions, scope, and applications of reactions useful in synthetic organic chemistry. Four hours lec. a week.

CHM 862. Organic Spectroscopy. (3) I. The principles of IR, UV-VIS, mass, and NMR spectroscopies applied to the problem of structure determination. Three hours lec. a week.

CHM 903. Graduate Seminar in Organic Chemistry. (0–1) I, II, S.

CHM 965. Physical Organic Chemistry. (3) II. Principles of orbital symmetry, thermochemistry, kinetics, and other topics applied to the understanding of reaction mechanisms. Three hours lec. a week.

CHM 970. Selected Topics in Organic Chemistry. (1–3) On sufficient demand. A lecture course in organic chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once.

Physical chemistry courses

Undergraduate and graduate credit in minor field

CHM 500. General Physical Chemistry. (3) II. Elementary principles of physical chemistry. Three hours lec. a week. Pr.: CHM 230 or CHM 250 and MATH 210 or MATH 220, and PHYS 114 or equivalent.

CHM 585. Physical Chemistry I. (3) I. Chemical thermodynamics and kinetic theory of gases. Three hours lec. a week. Pr.: CHM 230 or CHM 250, MATH 222, PHYS 214.

CHM 586. Physical Chemistry I Laboratory. (2) I. Six hours lab a week. Pr.: CHM 250 or CHM 371. CHM 585 or conc. enrollment.

CHM 595. Physical Chemistry II. (3) II. Elementary quantum chemistry, spectroscopy, and chemical kinetics. Three hours lec. a week. Pr.: CHM 585.

CHM 598. Physical Chemistry II Laboratory. (2) II. Six hours lab a week. Pr.: CHM 250 or CHM 371; CHM 595 or conc. enrollment.

Graduate credit

CHM 801. Chemical Thermodynamics. (3) II, in alternate years. The laws, principles, and methods of thermodynamics and their applications to chemical systems. Statistical-molecular approach emphasized. Three hours lec. a week.

CHM 854. Theoretical Chemistry I. (3) I. Introduction to quantum mechanics and atomic and molecular spectroscopy. Three hours lec. a week.

CHM 856. Chemical Kinetics. (3) I, in alternate years. Survey of experimental and theoretical aspects of dynamics of chemical reactions. Three hours lec. a week. Pr.: CHM 801 or CHM 854.

CHM 904. Graduate Seminar in Physical Chemistry. (0–1) I, II, S. Presentation of topics from literature in physical chemistry.

CHM 950. Chemical Statistical Mechanics. (3) I, in alternate years. Application of classical and quantum statistical mechanics to chemical phenomena. Three hours lec. a week. Pr.: CHM 801, 854.

CHM 954. Theoretical Chemistry II. (3) II. Quantum theory of atomic and molecular structure. Three hours lec. a week. Pr.: CHM 854.

CHM 955. Selected Topics in Physical Chemistry. (1–3) On sufficient demand. A lecture course in physical chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once. Pr.: CHM 854.

For more information

For additional information and application materials please contact:
Chairman, Graduate Admissions Committee
Department of Chemistry
Kansas State University
111 Willard Hall
Manhattan, KS 66506–3701
785-532-6665
Home page: http://www.ksu.edu/chem

Civil Engineering

Head

Stuart E. Swartz

Director of graduate studies

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Alok Bhandari, Ph.D., Virginia Polytechnic Institute and State University.

Peter B. Cooper, Ph.D., Lehigh University.

Mustaque Hossain, Ph.D., Arizona State University.

Kuo-Kuang Hu, Ph.D., Kansas State University.

Alexander P. Mathews, Ph.D., University of Michigan.

Hani G. Melhem, Ph.D. , University of Pittsburgh.

Yacoub M. Najjar, Ph.D., University of Oklahoma.

Robert J. Peterman, Ph.D., Purdue University.

Lakshmi N. Reddi, Ph.D., Ohio State University.

Eugene R. Russell, Ph.D., Purdue University.

Robert R. Snell, Ph.D., Purdue University.

Steven K. Starrett, Ph.D., Iowa State University.

David R. Steward, Ph.D., University of Minnesota.

Robert W. Stokes, Ph.D., Texas A&M University.

Stuart E. Swartz, Ph.D., Illinois Institute of Technology.

Program description

The Department of Civil Engineering at Kansas State University offers comprehensive programs leading to the degrees of master of science within the department and doctor of philosophy within the College of Engineering. Established programs of study are available in structural analysis and design, geotechnical engineering, water resources engineering, environmental engineering and transportation engineering and materials. An active research program is conducted in each of these areas, and it is the goal of the department to maintain a close association between graduate study, research, teaching, and engineering practice.

Program requirements

The general requirements for admission to the civil engineering graduate program include the receipt of a bachelor of science degree from an accredited civil engineering department and evidence that the applicant has the ability to do satisfactory graduate work. However, students not possessing a degree in civil engineering may be admitted if their undergraduate work is closely related to a specific discipline within the civil engineering program and they complete a core program of undergraduate civil engineering course work.

Students admitted for work toward a master of science degree can select a program of study requiring the completion of a master's thesis or a master's report within their area of interest. Students admitted for work toward a doctor of philosophy degree are required to develop an original research program, and complete a doctoral dissertation under the guidance of faculty members from the College of Engineering.

For information about the Ph.D. program, see the Engineering section of this catalog.

Research facilities

The Department of Civil Engineering has several laboratories which can be used to perform a wide variety of graduate research projects. These include laboratories in the areas of environmental engineering, hydraulic engineering, materials testing, soil mechanics, and water resources engineering.

The department also has the Kansas Testing Lab. for Civil Infrastructure which includes a full-scale Accelerated Pavement Testing facility, and a shake-table for Dynamic Testing of Structures and Seismic Research.

In addition, the department has modern computing facilities including a number of personal computers and workstations.

Financial support

The department has several graduate research assistantships and graduate teaching assistantships available. These positions are generally 0.4 or 0.5 time appointments and the stipends vary accordingly. In addition, a number of graduate research assistantships are supported through externally funded research projects obtained by individual faculty members. Student fees are assessed at the in-state level for graduate students who receive research or teaching assistantships.

Career opportunities

Graduate study in civil engineering will provide students with training for a wide variety of academic, technological, and public service careers. Students completing the master of science degree program typically find employment related to their chosen discipline in either private consulting firms or governmental agencies. Students completing the doctor of philosophy degree program can also expect to find employment in academic positions, or in government and private research laboratories.

Areas of emphasis

Environmental and water resources engineering: Bhandari, Mathews, Starrett, Steward

Structural analysis and design: Cooper, Hu, Melhem, Peterman, Snell, Swartz

Geotechnical engineering: Najjar, Reddi

Transportation and materials engineering: Hossain, Russell, Stokes

Civil engineering courses

Undergraduate and graduate credit in minor field

CE 522. Soil Mechanics I. (3) I, II. Identification, classification, and engineering properties of soils; theory and application of consolidation, compressibility, and strength of soils; ground water retention and movement; slope stability and lateral earth pressures; stress distribution in soil. Two hours rec. and three hours lab a week. Pr.: CE 533.

CE 528. Foundation Engineering. (3) I. Prediction of soil variation, soil investigations; stress distribution and bearing capacity; dewatering analysis and procedures; retaining structures and lateral earth pressures; shallow foundations, pile foundations; underpinning and grouting. Two hours rec. and three hours lab a week. Pr.: CE 522. Pr.: or conc.: CE 544.

CE 530. Statics and Dynamics. (4) I, II. A shortened combined course in (1) statics, including a study of force systems, free-body diagrams, and problems in equilibrium, friction, centroids, and moments of inertia; and (2) dynamics, including a study of the kinematics and kinetics of particles and rigid bodies using the methods of force-mass acceleration, work-energy, and impulse-momentum. Four hours rec. a week. Pr.: MATH 222 and PHYS 213.

CE 533. Mechanics of Materials. (3) I, II. Elementary theories of stress and strain, behavior of materials, and applications of these theories and their generalizations to the study of stress distribution, deformation, and instability in the simple structural forms which occur most frequently in engineering practice. Three hours rec. a week. Pr.: CE 333 or CE 530. Pr.: or conc.: MATH 222.

CE 534. Mechanics of Materials Laboratory. (1) I, II. Determination of selected mechanical properties of several engineering materials, including iron-carbon alloys, aluminum alloys, concrete, wood, and plastics; relationship between structure and mechanical properties of these materials; elementary problems in experimental stress analysis and structural behavior; test procedures, instrumentation, and interpretation of results. One hour lab instruction and two hours lab a week. Pr.: or conc.: CE 533.

CE 537. Introduction to Structural Analysis. (4) I, II. Elastic analysis of determinate and indeterminate beams, frames, and trusses; construction of shear and moment diagrams and influence lines; calculation of deflections using conjugate beam and virtual work; solution of indeterminate structures by consistent deformation, slope-deflection, moment distribution, and matrix stiffness method; with microcomputer applications. Four hours rec. a week. Pr.: CE 533. Pr.: or conc.: CE 380.

CE 542. Structural Engineering in Steel. (3) II. Introduction to design of steel structures. Theoretical, experimental and practical bases for proportioning members and their connections. Two hours rec. and three hours lab. a week. Pr.: CE 537.

CE 544. Structural Engineering in Concrete. (3) I. A study of the theories of reinforced concrete and of its characteristics as a construction material; design of reinforced concrete structures. Two hours rec. and three hours lab. a week. Pr.: CE 537.

CE 551. Hydrology. (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr.: PHYS 113 or 213. Cross-listed with BAE 551.

CE 552. Hydraulic Engineering. (3) II. Applications of the principles of fluid mechanics to control and use of water; reservoir, dam, and spillway design; enclosed conduit and open-channel design; hydraulic machinery and hydro-power development; principles of fluid measurement; laboratory-flow and velocity metering, hydraulic models, pipe losses, open-channel flow. Two hours rec. and three hours lab. a week. Pr.: ME 571. Pr. or conc.: CE 551.

CE 553. Hydrologic Methods Laboratory. (1) I, II. Applications of hydrologic methods in design; precipitation data analysis; evapotranspiration; stream gauging; hydrograph generation and flood routing; rainfall and flood frequency analysis; design of multipurpose reservoirs; ground water flow analysis and water well design. Three hours lab a week. Pr.: CE 380 or BAE 200. Pr. or conc.: CE 551.

CE 563. Environmental Engineering Fundamentals. (3) I, II. Basic physical, chemical, and biological concepts and the applications to the protection of the environment with emphasis on techniques used in water and wastewater treatment. Two hours rec. and three hours lab a week. Pr.: CHEM 230 and MATH 222.

CE 565. Water and Wastewater Engineering. (3) II. Design of water supply and waste treatment control facilities, including collection, storage, treatment, and distribution systems. Two hours rec. and three hours lab a week. Pr.: CE 563, PHYS 214, and ME 571.

CE 570. Transportation Planning. (3) Intersession. Fundamentals of transportation planning. Historical development and current status of techniques used in travel demand forecasting; trip generation, trip distribution, mode choice, and traffic assignment. Current microcomputer models and applications. Pr.: CE 380 or equivalent and junior standing.

CE 572. Highway Engineering and Management. (3) I. Applications of the principles of highway planning, design, and capacity analysis techniques to analyze, design and maintain street and highway systems. Assessment of the impact of activity center development or redevelopment on the surrounding surface transportation system. Two hours rec. and three hours lab a week. Pr.: CE 411 and 522.

CE 580. AI Applications in Civil Engineering. (2) Intersession. A review of the available techniques in artificial intelligence and a survey of applications in the different areas of civil engineering (structures, transportation/materials, geotechnical, hydraulics/water resources, and environmental engineering). Knowledge representation, inference mechanisms, system development and evaluation, object-oriented programming. Use of expert system shells, neural networks and fuzzy logic. Hands on applications on microcomputers in the MS-Windows environment. Three hours rec. for 10 days. Afternoon lab hours additional in computer lab. Pr.: CE 380.

CE 585. Civil Engineering Project. (1–3) I, II. A comprehensive civil engineering project. Requires integration of skills acquired in civil engineering elective courses. Students must prepare and present written and oral design reports. One hour rec. and two three-hour labs a week. Pr.: ENGL 415 and 6 hours of CE electives. Pr.: or conc.: 6 additional credit hours of CE electives.

Undergraduate and graduate credit

CE 641. Civil Engineering Materials I. (3) I. Properties and behavior of structural metals, timber, portland cement concrete, and bituminous concrete; standard specification and methods of test; inspection and control; long-term protection and durability. Two hours rec. and three hours lab a week. Pr.: CE 534 and ENGL 415. Pr.: or conc.: either CE 528 or 542 or 544.

CE 680. Economics of Design and Construction. (3) II. Selection of alternative engineering design and construction solutions through study of unit cost determination, cost estimating, and financing procedures. Introduction to construction scheduling. Three hours rec. a week. Pr.: Senior standing in engineering or graduate standing for non-engineering majors.

CE 686. Regional Planning Engineering. (3) I. Engineering problems involved in regional planning; the design and location of streets and highways, water supply and sanitary facilities, drainage and public utilities; rights-of-way and easement. Two hours rec. and three hours lab a week. Pr.: Senior standing in engineering or graduate standing in regional and community planning.

CE 718. Engineering Photo Interpretation. (3) II. Photo interpretation techniques, types of aerial photographic film and their uses; application in land use studies, land surveying, site selection, rainfall runoff and stream flow, location of construction materials, and in the determination of soil properties; other applications. Two hours rec. and three hours lab a week. Pr.: Senior standing and consent of instruction.

CE 723. Designing with Geosynthetics. (3) II, in alternate years. History of geosynthetics; overview of geosynthetic functions, applications and properties; relationship between testing and applications. Designing with geotextiles, geogrids, geonets, geomembranes, geosynthetic clay liners and geocomposites. Three hours rec. a week. Pr.: CE 522.

CE 725. Seepage in Permeable Materials. (3) I, in alternate years. Analysis of seepage; groundwater movement in slopes, embankments, dams, and earth-supporting structures; construction of flow nets; dewatering systems; filter and drain design. Three hours rec. a week. Pr.: CE 522 and CE 552.

CE 728. Advanced Geotechnical Design. (3) II. Advanced studies of soil investigations; design of retaining structures and reinforced earth walls, sheet piles, anchored bulkheads, underground conduits and tunnels; analysis and repair of failed structures. Two hours rec. and three hours lab a week. Pr.: CE 528.

CE 732. Advanced Structural Analysis I. (3) I. Classical methods of analysis of statically indeterminate structures; deflections and influence lines for indeterminate structures; analysis of space frames and trusses. Three hours rec. a week. Pr.: CE 537.

CE 741. Civil Engineering Materials II. (3) II. Advanced study of civil engineering materials including concrete, steel and bituminous concrete. Two hours rec. and three hours lab a week. Pr.: CE 641 or CHE 350.

CE 742. Advanced Steel Design. (3) II. Plastic design of steel structures; stability problems in plastic design; design of complex steel structures. Three hours rec. a week. Pr.: CE 542.

CE 743. Advanced Reinforced Concrete Theory. (3) II. Advanced theories and methods of design and analysis of reinforced concrete structures. Three hours rec. a week. Pr.: CE 544.

CE 751. Hydraulics of Open Channels. (3) I. Properties of open-channel flow; types of open channels; conservation of mass, momentum, and energy; critical, uniform, and gradually varied flow; design of erodible channels; rapidly varied flow. Three hours rec. a week. Pr.: CE 552.

CE 752. Advanced Hydrology. (3) I. Review of basic principles; point and regional rainfall and flood frequency analyses; hydrologic and hydraulic flood routing; drainage and flood control facilities design; hydrologic modeling and simulation flood plain analysis and planning. Three hours rec. a week Pr.: CE 551.

CE 762. Water Treatment Processes. (3) II. Physical and chemical process principles and their application to water treatment plant design. Three hours rec. a week. Pr.: CE 565.

CE 766. Wastewater Engineering: Biological Processes. (3) I. Biological process principles and their application to the design of wastewater treatment plants. Three hours rec. a week. Pr.: CE 565.

CE 771. Urban Transportation Analysis. (3) II. Origin-destination surveys, land-use inventories, parking and transit studies; arterial street standards and operating characteristics, coordination of city planning. Two hours rec. and three hours lab a week. Pr.: CE 572 or consent of instructor.

CE 774. Pavement Design. (3) I. On sufficient demand. Methods of evaluating the load-carrying capacity of soil subgrade, subbase, and base courses; critical analysis of the methods of design for flexible and rigid pavements; methods of increasing the load-carrying capacity of highway and airport pavements. Two hours rec. and three hours lab a week. Pr.: CE 522.

CE 775. Traffic Engineering I. (3) I. Traffic operations of roads, streets, and highways; traffic engineering studies; use of signs, signals, and pavement markings as traffic control devices; highway and intersection capacity, design and operations of traffic signals; current microcomputer models and applications. Two hours rec. and three hours lab a week. Pr.: CE 572.

CE 776. Pavement Performance and Management Systems. (3) I, in alternate years. Pavement management systems including pavement condition and structural evaluation, analysis, and optimization. Economics analysis and rehabilitation planning including computer applications. Three hours rec. a week. Pr.: CE 572.

CE 790. Problems in Civil Engineering. (Var.) I, II, S. Pr.: Approval of instructor.

Graduate credit

CE 791. Research in Civil Engineering. (Var.) I, II, S. Original investigation or advanced study in some field related to the practice of civil engineering. Pr.: Approval of department head.

CE 801. Computational Methods in Civil Engineering. (3) I, in alternate years. Theory and application of interpolation, differentiation, integration, iterative solution methods, finite differences, finite elements and other approximate techniques for numerical solutions to problems in civil engineering. Three hours rec. a week. Pr.: Graduate standing.

CE 802. Advanced Mechanics of Materials. (3) I. Two- and three-dimensional stress-strain transformations, finite deformation and theories of failure. Advanced topics in bending, shearing, torsion and combined loads, thick walled cylinders and rotating disks. Introduction to theory of elasticity, plasticity and plates and shells. Three hours rec. a week. Pr.: CE 533.

CE 807. Applied Geostatistics. (2) Spring Intersession, odd years. Analysis of spatially-correlated data. Univariate, bivariate, and spatial description; global and point estimation; random function models; stationarity; intrinsic hypothesis; semivariogram; correlogram; ordinary and block kriging; cross validation; cross correlation and cokriging; experimental design. One hour lec. and one hour computer lab a day. Pr.: STAT 510 or STAT 703. Cross-listed with AGRON 807, STAT 807.

CE 816. Selected Topics in Civil Engineering. (Var) I, II, S, on sufficient demand. Study of intermediate level topics of interest in civil engineering. Topics announced when offered. Pr.: Graduate standing and approval of instructor.

CE 822. Shear Strength and Slope Stability of Soils. (3) II, in alternate years. Advanced theories of soil strength and failure; soil improvement; theories of lateral earth pressure with applications; stability analysis by both classical and numerical methods. Selected soil mechanics laboratory project. Three hours rec. a week. Pr.: CE 728.

CE 823. Engineering Properties of Cohesive Soils. (3) I. Mineralogy and structures of clay minerals; fabric and bonding of the clay particles; compressibility and strength characteristics of clays; moisture effects, retention, and movement through clay. Three hours rec. a week. Pr.: CE 522 and CE 725.

CE 825. Environmental Geotechnology. (3) I, in alternate years. Soil/environment and soil/pollutant interactions; pollutant effect on soil strength and behavior; design and performance of waste containment structures; clay liners, surface seals, and slurry walls; slope stability problems for landfills. Three hours rec a week. Pr.: CE 725.

CE 828. Advanced Soil Mechanics. (3) I. Permeability and seepage analysis involving dams and sheet piles; stress distribution in earth masses, one- and three-dimensional consolidation theories; advanced study of compressibility of soil, numerical method applications in consolidation and seepage; analysis of settlement. Selected soil mechanics laboratory project. Three hours rec. a week. Pr.: CE 522 and CE 802.

CE 833. Advanced Structural Analysis II. (3) II. Application of matrix methods of analysis to complex structures; structural optimization, selected advanced topics in structural analysis. Three hours rec. a week. Pr.: CE 537.

CE 836. Energy Methods and Applied Variational Principles. (3) II, in alternate years. Theory and applications of virtual work, minimum potential, and variational principles using generalized coordinates, displacements, and forces to derive and solve advanced problems in structural, soil and hydrodynamic problems. Three hours rec. a week. Pr.: CE 801.

CE 837. Structural Stability. (3) II. Analysis of flexible members. Linear and nonlinear buckling of beams, frames, plates and complicated structural systems; post buckling behavior of steel structures. Three hours rec. a week. Pr.: CE 802.

CE 844. Prestressed Concrete Design. (3) I. Study of prestressing methods including strength and load-balancing approaches and their application to the analysis and design of beams, slabs, and axially loaded members. Flexural, shear, torsion, and anchorage-zone analysis. Study of deflection and time-dependent losses. Three hours rec. a week. Pr.: CE 544.

CE 854. Analysis of Groundwater Flow. (3) II. Principles of flow through porous media; applications of flow theory to well analysis and design; groundwater resource evaluation and regional groundwater systems analysis. Three hours rec. a week. Pr.: CE 552.

CE 861. Environmental Engineering Chemistry. (3) I. Chemical kinetics and equilibria, acid-base chemistry, complex formation, precipitation and dissolution processes, and applications to the analysis of environmental engineering problems. Three hours rec. a week. Pr.: CE 565, CE 762.

CE 863. Water Supply and Wastewater Collection Systems. (3) I, in alternate years. Analysis and design of water distribution networks, pump stations and storage reservoirs; wastewater collection and pump station system design; computer applications and systems optimization. Three hours rec. a week. Pr.: CE 565, CE 801.

CE 873. Airport Design. (3) II. On sufficient demand. Planning and design of a regional airport, including site selection in conformance with state and federal regulations; layout and design of runway system; size and layout of terminal buildings, landside facilities, parking lots, and circulation system. Two hours rec. and three hours lab a week. Pr.: CE 572.

CE 875. Traffic Engineering II. (3) II. Theory of traffic flow; design of traffic control devices and signal systems; application of statistical methods to traffic engineering problems. Two hours rec. and three hours lab a week. Pr.: CE 775. Pr.: or conc.: STAT 510.

CE 890. Graduate Seminar in Civil Engineering. (0) I, II. Discussion of current advances and research in civil engineering. One hour seminar biweekly. Pr.: None.

CE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

CE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

CE 916. Advanced Topics in Civil Engineering. (Var.) I, II, S. On sufficient demand. A course reserved for study of current topics in civil engineering. Topics announced when offered. Pr.: Eighteen hours graduate credit in areas approved by instructor.

CE 930. Advanced Topics in Geotechnical Engineering. (Var.) I, II. On sufficient demand. Advanced study of selected topics in geotechnical engineering. Topics announced when offered. Pr.: Eighteen hours graduate credit in areas approved by instructor.

CE 935. Structural Dynamics. (3) I, in alternate years. Analysis of structures subject to dynamic loadings. Optimization of structural systems to minimize earthquake hazards. Three hours rec. a week. Pr.: CE 802.

CE 938. Theory of Plates and Shells. (3) I, in alternate years. Equations and solutions of bending of thin plates of various edge conditions and shapes. Membrane and bending theory of shells of revolution. Nonlinear theory of plates and shells. Three hours rec. a week. Pr.: CE 802.

CE 950. Advanced Topics in Structural Engineering. (Var.) I, II. On sufficient demand. Advanced study of selected topics in structural engineering. Topics announced when offered. Pr.: Eighteen hours graduate credit in areas approved by the instructor.

CE 967. Physicochemical Processes. (3) II, in alternate years. Advanced study of physical and chemical processes in the movement and removal of particulates and organics in natural and engineered systems. Three hours rec. a week. Pr.: CE 861.

CE 970. Advanced Topics in Environmental and Water Resources Engineering. (Var.) I, II. On sufficient demand. Advanced study of selected topics in environmental and water resources engineering. Topics announced when offered. Pr.: Eighteen hours graduate credit in areas approved by the instructor.

CE 980. Advanced Topics in Transportation and Materials Engineering. (Var.) I, II. On sufficient demand. Advanced study of selected topics in transportation engineering and civil engineering materials. Topics announced when offered. Pr.: Eighteen hours graduate credit in areas approved by the instructor.

CE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head.

For more information

For additional information and application materials please contact:
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Clinical Sciences

Head

Roger Fingland

Graduate faculty

David Biller, DVM, Auburn University.

Alan Brightman, DVM, Kansas State University; MS, University of Illinois.

James Carpenter, DVM, MS, Oklahoma State University.

Peter J. Chenoweth, Ph.D., University of Queensland, Australia.

Ruthanne Chun, DVM, University of Wisconsin–Madison.

Deborah Davenport, DVM, Auburn; MS, Ohio State University; BS, North Carolina.

Harriett Davidson, DVM, MS, Michigan State University.

Linda DeBowes, DVM, Washington State University; MS, Kansas State University.

Richard M. DeBowes, DVM, University of Illinois; MS, Washington State University.

Steve Dritz, DVM, University of Minnesota, Ph.D., Kansas State University.

Roger Fingland, DVM, University of Missouri–Columbia; MS, The Ohio State University.

John Galland, MS, Ph.D., University of California.

Earl Gaughan, DVM, University of Georgia.

Jerry Gillespie, DVM, Oklahoma State; Ph.D., University of California-Davis.

James Hoskinson, DVM, Washington State University.

Claudia Kirk, DVM, Ph.D., University of California at Davis.

Susan Kraft, DVM, Ph.D., Washington State University.

James D. Lillich, DVM, Colorado State University; MS, Ohio State University.

Dennis Olsen, DVM, Oregon State University and Washington State University; MS Colorado State University.

Daniel Richardson, DVM, BS, Kansas State University.

James Roush, DVM, Purdue University; MS, University of Washington.

Bonnie Rush, DVM, MS, The Ohio State University.

Janice Sargeant, PhD, MSc, DVM, University of Guelph.

Mark Spire, DVM, Texas A&M; MS, Kansas State University.

Jerome Vestweber, DVM, University of Minnesota; Ph.D., Kansas State University.

About the department

The Department of Clinical Sciences offers a graduate program leading to the master of science degree. Graduate work in clinical sciences may be pursued in several fields of specialization including agricultural

practice, anesthesiology, equine medicine and surgery, exotic and wildlife medicine, ophthalmology, radiology, small animal medicine, small animal surgery, and theriogenology. The department, with the Veterinary Medical Teaching Hospital, has modern facilities and equipment for studies of applied and basic aspects of diseases and other conditions of animals.

The primary goal of graduate study programs in clinical medicine is to prepare students for careers in teaching and research in a clinical specialty area. After completing graduate work, the student shall be able to conduct research both independently and as a team member. Adequate training in planning research projects and writing research proposals will give the student the ability to function with teams of scientists from the biomedical field. The student's experience in clinical teaching and literature study will form the basis for development of future teaching programs within his or her discipline.

A residency program designed to prepare and qualify a veterinarian for admission to one of a number of specialty boards recognized by the AVMA is usually combined with the graduate program. While a graduate program can be accomplished in a shorter period of time, the duration of combined programs is usually three years. This reflects the minimum time required to satisfy the objectives of each program. Details of an individual residency program can be obtained from the head of the Department of Clinical Sciences. An individually tailored graduate program concurrent with professional veterinary school or for non-DVM applicants can be arranged on an individual basis.

Veterinary Medical Teaching Hospital

The KSU–Veterinary Medical Teaching Hospital (KSU–VMTH) is equipped for diagnosis and treatment of animal disease and for instruction of veterinary students, house officers, and postgraduate veterinarians. The hospital has a capacity of 82 large animal patients and 150 small animal patients. Clinical faculty accompanied by students provide clinical veterinary service to clients in the local community, for clients of referring veterinarians from an eight-state region, and on local and regional livestock farms. In addition to caring for sick animals, they provide preventative medical services and consultation on production medicine and management. KSU-VMTH provides full veterinary service for clients and referring veterinarians from Kansas, Nebraska, Missouri, and Oklahoma and some educational programs are conducted in conjunction with the University of Nebraska Veterinary Educational Center at Clay Center, Nebraska.

Fourth-year students are active participants in the hospital and clinical services. Students are regularly assigned on a rotation basis during the year to various specialists on the clinical and pathology staffs. The department presents courses in medicine, surgery, oncology, dermatalogy, exotics, ophthalmology, theriogenology, and other clinical specialties to veterinary students and post-DVM trainees. For more information on graduate work, courses, and faculty, see entry the clinical section.

Requirements for admission

Admission requirements include holding a doctor of veterinary medicine degree or its equivalent. Applicants for graduate study must have a minimum grade average of B. Applicants currently enrolled in the professional veterinary curriculum or those holding a baccalaureate degree will be considered on an individual basis.

A student who has less than a B average, based on individual merit, may be admitted on probationary status. Full standing is attained automatically upon completion of at least 9 hours of course work for graduate credit with grade of B or better and upon the removal of any deficiency which was specified at the time of admission. International students must have a health certificate and an acceptable score on the Test of English as a Foreign Language (TOEFL).

Additionally, international students must be able to demonstrate proficiency in written and oral English to the departmental graduate committee. Qualifications of students must be approved, in writing, by the departmental graduate committee prior to recommending acceptance in to graduate studies to the department head.

A graduate student may be denied continued enrollment in the university in case of:

a. Failure to satisfy conditions necessary for removal of probationary status.

b. The accumulation of 6 or more semester hours of work with grades less than B, or grade point average less than 3.0.

c. Demonstrable lack of diligence in meeting published degree requirements.

d. Failure to acquire mastery of the methodology and content of one's field sufficient to complete a successful thesis.

Application for admission

Department-sponsored postgraduate residencies normally start each year in June and are advertised in the American Association of Veterinary Clinicians' *Directory of Intern Matching Program and Residencies*. Three letters of recommendations, AAVC application, undergraduate and professional transcripts, letter of interest, and a completed graduate school application and information blank should be filed with the department head for consideration by the graduate committee.

General requirements

Participation in the teaching program is considered to be part of graduate education. The extent of the participation will be to a level that is deemed of value for each particular student. A certain amount of advanced clinical training is required of graduate students. This will usually be conducted in the K-State Veterinary Medical Teaching Hospital.

The master's degree in clinical sciences usually requires a thesis. The credit requirements for a master's degree are in accordance with those for the Graduate School. A minimum of 30 semester hours of credit including 6 to 8 hours of thesis credit are required. Only two 500-level courses (6 hours total) may be used for an MS. A significant majority of course work (at least 60 percent) should be at the 700 level or higher. Only 3 hours of problems or individualized study may apply toward the MS. Successful completion of a final oral or comprehensive written examination, or both, are required of all master's degree candidates.

The final examination is administered by the supervisory committee and may include defense of the thesis, or a testing of the student's understanding of the field of study.

Clinical science and professional veterinary medicine courses

Courses 700–799 are offered for the doctor of veterinary medicine degree only.

Courses 800–849 are offered for the doctor of veterinary medicine degree and graduate credit with permission of instructor.

Courses 850–900 are given for graduate credit only with permission of the instructor.

For a listing of all courses, see the Department of Clinical Sciences.

Doctor of veterinary medicine degree only

CS 701. Clinical Skills I. (1) II. Introduction to terminology and thought/organization for clinical veterinary medicine. Emphasis on problem identification from a clinical data base, and basic veterinary skills with animals. Three hours lab a week. Same as AP 801. Pr.: First-year standing in the College of Veterinary Medicine.

CS 703. Clinical Skills II. (1) II. Continuation of Clinical Skills I. Introduction to clinical cases, data base accumulation, problem identification, problem solving, and basic veterinary skills with animals. Three hours lab week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 704. Clinical Skills III. (1) II. Laboratory instruction and experience in hand skills for physical examination and for veterinary therapy. Three hours lab a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 709. Medicine I. (4) II. Consideration of medical and pathophysiologic aspects of diseases affecting the musculoskeletal, respiratory, cardiovascular special senses, nervous hemic and lymphatic systems. Four hours lec. a week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 710. Companion Animal Medicine. (4) II. A study of the etiology, clinical signs, diagnosis, treatment, and control of infectious or contagious diseases which affect horses, dogs, and cats. Four hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine.

CS 711. Medicine II. (4) I. Consideration of the medical and pathophysiological aspects of diseases affecting the gastrointestinal, endocrine, urinary, and integumentary systems. Four hours lec. a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 712. Food Animal Medicine. (4) I. A study of the etiology clinical signs, diagnosis, treatment and control of diseases which affect cattle, swine, and sheep Four hours lec. a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 713. Production Medicine. (2) II. The role of the veterinarian in livestock production units, including interactions with producers, nutritionists, investors and others in decision analysis. Emphasis is on the professional service that veterinarians provide to beef feedlot, cow/calf, swine, dairy, equine, and dog kennel segments of animal production. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 714. Clinical Nutrition. (3) II. The clinical aspects of nutrition as it relates to (a) medical and surgical management of diseased and convalescent animals (therapeutic nutrition), and (b) programs of disease prevention of the common domestic species of food-producing, companion animals, pet birds, and exotic animals (nutritional preventative medicine). Same as ASI 886 and AP 886. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 715. Radiology. (3) II. The theory and principles of x-rays, production and interpretation of radiographs and exposure factors, special radiographic methods, film storage and handling, processing, safety measures, and biologic effects of radiation. Three hours lec. a week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 716. Clinical Small Animal Surgery. (6) I, II, S. This course is designed to train veterinary students in the diagnosis and treatment of small animal surgical diseases through participation in clinical service in the Veterinary Teaching Hospital. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 717. Clinical Small Animal Medicine. (6) I, II, S. The study of preventive medicine, internal medicine, and special medicine in the setting of the veterinary medical center. Problem solving, differential diagnosis, diagnostic procedures, and medical treatment of small animal disease will be emphasized using veterinary patients. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 719. Basic Equine Medicine and Surgery Clinics. (6) I, II, S. This course will offer the veterinary student a general exposure to clinical problems and problem-solving of medical and surgical diseases of horses. The student will be responsible for and involved in the diagnosis, treatment and nursing care of equine patients affected by a variety of conditions. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 720. Advanced Equine Theriogenolgy. (1) I. An in-depth exposure to methods of maximizing reproductive efficiency in the mare and the stallion. Advanced equine reproductive physiology, diagnostics, and therapeutics are emphasized. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 721. Agricultural Clinical Practices. (6) I, II, S. A study of the role of the veterinarian in the practice of clinical medicine in livestock production units. Students will work under faculty supervision in local practice and in-hospital situations. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 722. Advanced Agricultural Clinical Practices. (Var.) I, II, S. Advanced studies in the practice of veterinary medicine and surgery emphasizing the application of problem-solving methodology in livestock health and production programs. Pr.: CS 721 or consent of the instructor.

CS 723. UNL–KSU Food Animal Production Medicine. (1) I, II, S. A study of the role and responsibility of the veterinarian in the practice of clinical veterinary medicine in livestock production units. Students will work under University of Nebraska–Lincoln and KSU faculty supervision at the Great Plains Veterinary Education Center with swine, sheep, and beef cattle. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 724. Veterinary Diagnostic Imaging I. (3) I, II, S. Radiographic, ultrasonographic and nuclear imaging in the clinical setting, with emphasis on making/identifying images of diagnostic quality, interpretation, indications for imaging, and radiation safety. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 725. Clinical Anesthesia. (3) I, II, S. Practical instruction in the skills and techniques used in the practice of clinical veterinary anesthesia of both large and small animals. May be repeated once. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 726. Clinical Externship and/or Programmed Study. (Var.) I, II, S. Practical experience with the daily operation of veterinary practice, insights into the role of veterinarians in private industry, and/or opportunity to become involved in specialty areas relating to veterinary medicine in other academic institutions. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 727. Ophthalmology. (3) I, II, S. The study of the surgery and medical diagnosis and treatment of ocular disease in animals in the setting of the veterinary medical hospital. Problem solving, differential diagnosis, diagnostic procedures, and medical and surgical therapy will be emphasized using veterinary patients. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 728. Theriogenology. (3) I. Consideration of prevention, diagnosis, and treatment of disease and maintenance of health and productivity of the genital tract of domestic animals. Three hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine.

CS 729. Veterinary Surgery I. (5) I. Introduction to the basics of veterinary anesthesia, surgical techniques, and patient management by a systems design. Problems common to all species of domestic animals will be presented to provide foundations of surgical knowledge and experience. Four hours lec. and one hour lab a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 730. Veterinary Surgery II. (5) II. A continuation of Veterinary Surgery I. Introduction to the basics of veterinary anesthesia, surgical techniques, and patient management by a systems design. Problems common to all species of domestic animals will be presented to provide foundations of surgical knowledge and experience. Four hours lec. and one lab a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 732. Topics in Equine Internal Medicine. (2) S. Selected topics in equine internal medicine. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 736. Pleasure Horse Medicine. (2) I. In-depth exposure of most frequent concerns encountered by the equine practioner. Topics will be addressed as problems rather

than specific diseases. Management differentials, diagnosis and therapy will be emphasized. Lectures 4 hours per week, no laboratory sessions. Pr.: Fourth-year standing in College of Veterinary Medicine.

Doctor of veterinary medicine degree and graduate credit with permission of instructor

CS 800. Problems in Medicine or Surgery. (1–9) I, II, S. The course provides for the study of medical or surgical problems. The student, in conference with the major professor, outlines the methodology and procedures, conducts the study, and prepares a detailed report. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 802. Advanced Small Animal Surgery. (Var.) I, II, S. This course provide veterinary students an opportunity for advanced training in the diagnosis and treatment of small animal surgical diseases through participation in clinical service in the Veterinary Medical Teaching Hospital. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 716.

CS 803. Advanced Small Animal Medicine. (Var.) I, II, S. Advanced topics in preventative medicine, kennel medicine, greyhound medicine, internal medicine, dermatology, neurology, and cardiology. The student will be required to participate in a special problem with a written report. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 717.

CS 806. Advanced Equine Medicine and Surgery. (Var.) I, II, S. This course provides an opportunity for students to pursue equine clinical studies in depth and assume substantial responsibility for care of hospitalized cases. Students will present a seminar on a medicine or surgical subspecialty and pursue a special problem. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 719.

CS 813. Beef Production Medicine. (1) I. A study of the development, initiation, maintenance and monitoring of production-oriented health management delivery systems in beef cattle operations. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 814. Veterinary Diagnostic Imaging II. (3) I, II, S. Students will receive advance training in radiologic interpretation and alternate imaging procedures. Emphasis will be on didactic and hands-on training in ultrasound imaging. Pr.: CS 724.

CS 820. Equine Lameness. (2) II. Concentration on musculoskeletal origins of lameness problems in horses, including diagnosis, treatment, management, and prognosis. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 821. Vet Medicine for South American Camelids. (1) II. The health concerns of South American Camelids are presented in terms of medicine, surgery, theriogenology, and associated disciplines. Pr.: Third- or fourth-year standing in the College of Veterinary Medicine, DVM degree.

CS 822. Exotic Animal, Wildlife and Zoo Medicine. (3) I, II, S. Study of exotic, wildlife, and zoo animal medicine through participation in the clinical service in the Veterinary Medical Teaching Hospital. Problem solving, differential diagnosis, diagnostic procedures, and medical and surgical therapy of nondomestic animals will be emphasized. Pr.: Fourth-year standing in the College of Veterinary Medicine.

Graduate credit only with permission of the instructor

CS 850. Research in Medicine. (1–6) I, II, S. An attempted solution of some of the medical and parasitological problems confronting the practitioner of veterinary medicine. Pr.: Consent of staff.

CS 852. Interpretation of Radiologic Studies of Body Systems. (3) I, in odd years. Advanced discussions of radiologic interpretation, indications and interpretation of alternate imaging procedures (MRI, CT, nuclear medicine, ultrasound). Pr.: DVM degree or consent of department head prior to registration.

CS 854. Systemic Medicine I. (1–3) I, II, S. Study of the medical aspects of diseases of the urinary, nervous, and integumentary systems and special senses. Pr.: DVM degree or consent of department head.

CS 855. Systemic Medicine II. (1–3) I. Study of the medical aspects of diseases of the cardiovascular, respiratory, musculoskeletal and endocrine systems. Pr.: DVM degree or consent of department head.

CS 858. Orthopedic Surgery. (4) II, in even years. Fundamentals, theory, and practice concerning genetic, metabolic, infectious, neoplastic, and traumatic diseases of bones and joints. Pr.: DVM degree or consent of department head.

CS 859. Clinical Sciences Seminar. (1) I, II, S. A required seminar for all house officers and graduate students in the Department of Surgery and Medicine. One hour conference weekly. May re-enroll for total maximum of two credits. Pr.: Consent of department head.

CS 864. Equine Hard Tissue Surgery. (2) I, in even years. Selected procedures in equine orthopedic surgery will be presented. Discussions will review treatment selection and indications, alternative modalities, intraoperative techniques, pathophysiology, adjunctive therapies, aftercare and complications. Pr.: DVM degree or consent of department head.

CS 865. Equine Soft Tissue Surgery. (2) II, in even years. A presentation of complex surgical techniques not available in the professional curriculum will be provided for the post-DVM trainee. The indications reaction, technical aspects, therapeutic attributes, and complications of selected procedures will be addressed. Pr.: DVM degree or consent of department head.

CS 867. Advanced Diagnostic Imaging—Small Animal. (1) I. Case presentation/discussion of diagnostic imaging techniques used in small animal veterinary practice, including radiography, ultrasonography, nuclear imaging, magnetic resonance imaging, and computer tomography. Clinical cases will demonstrate imaging methods and technology used in the various body systems, with an emphasis on interpretation and clinical diagnosis. Students may re-enroll for a maximum of three credits. Pr.: DVM degree.

CS 890. Clinical Sciences Problems. (1) II. Advanced instruction in research topics and technologies emphasizing various clinical disciplines.

CS 895. Research Methods. (1) I. Discussion of research design, grantsmanship, practical statistics, manuscript preparation, and ethics. Pr: DVM degree or consent of department head.

CS 899. Thesis Research in Clinical Sciences. (1–6) I, II, S. Individual research in any of the fields of Clinical Sciences. Pr.: Graduate standing. This work may form the basis of the M.S. thesis.

For more information

For additional information and application materials please contact:
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106A Veterinary Medical Sciences Building
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Veterinary medicine homepage:
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College Student Personnel Work

See the Student Counseling and Personnel Services section of this catalog for information about the M.S. program with an emphasis in college student personnel work.

Computing and Information Sciences

Head
Virgil Wallentine

Director of graduate studies
David Gustafson

Graduate faculty
Daniel Andresen, Ph.D., U. of California, Santa Barbara.

Myron Calhoun, Emeritus, Ph.D., Arizona State University.

Matthew Dwyer, Ph.D., University of Massachusetts–Amherst.

David Gustafson, Ph.D., University of Wisconsin–Madison.

William Hankley, Ph.D., Ohio State University.

John Hatcliff, Ph.D., Kansas State University.

Rodney Howell, Ph.D., University of Texas–Austin.

Michael Huth, Ph.D., Tulane University of Louisiana.

Masaaki Mizuno, Ph.D., Iowa State University.

Mitchell Neilsen, Ph.D., Kansas State University.

David Schmidt, Ph.D., Kansas State University.

Gurdip Singh, Ph.D., State University of New York-Stony Brook.

Allen Stoughton, Ph.D., Edinburgh University.

Elizabeth Unger, Ph.D., University of Kansas.

Maarten Van Swaay, Emeritus, Ph.D., Princeton.

Virgil Wallentine, Ph.D., Iowa State University.

Maria Zamfir-Bleyberg, Ph.D., University of California–Los Angeles.

The Department of Computing and Information Sciences offers courses of study leading to the master of science, master of software engineering, and doctor of philosophy degrees. As of fall 1998, the department consisted of 15 graduate faculty members, two full- time technical support staff, 29 M.S. students, 47 M.S.E. students, and 11 Ph.D. students. During the 1997–1998 year 30 M.S. degrees, 7 M.S.E. degrees and 3 Ph.D. degrees were granted. Recent faculty research projects have been funded by the National Science Foundation, Office of Naval Research, U.S. Air Force, AT&T, U.S. Department of Agriculture, Lucent Technologies, and DARPA.

Objectives

The department is committed to excellence in scholarly activities and research; interdepartmental and interuniversity collaborative projects are particularly emphasized. Key research areas include programming languages, distributed and real-time systems, databases, and software engineering.

Research groups

Programming languages research in the department concentrates upon techniques and tools for designing, analyzing, and implementing programming languages. Specific topics include abstract interpretation, algebraic semantics, compiler synthesis from denotational semantics definitions, full abstraction, lambda definability, type theory,

probabilistic semantics, concurrency theory, and model checking.

Research performed by the distributed and real-time systems research group broadly falls under the following categories: distributed programming structures and models, relation and fault-tolerance, concurrency control on shared data, distributed network protocols and algorithms, distributed and parallel discrete event simulation, parallel programming and synchronization, real-time systems, and high speed network architectures. In each category, issues in formal modeling, specification and verification, and computational complexity, and implementation are investigated. Formal modeling provides the theoretical basis for the analysis of distributed systems; specification and verification validates the correctness of distributed programming primitives and communication protocols during system design; and computational complexity investigates the feasibility of proposed designs; implementation allows building of prototype systems that encapsulate newly designed primitives, abstractions, and protocols.

Database research in the department focuses on basic theoretical and practical issues in mainstream databases, as well as on issues lying at the border of databases and AI. Topics include data and knowledge base design, database security and integrity, static and dynamic integrity constraints, extensible database management systems, temporal and active databases, and intelligent database systems. Other research issues include knowledge discovery in databases, data mining, and data warehousing.

The department's software engineering research encompasses measures, specification, testing, and analysis of sequential and concurrent software systems. Software measures research applies measurement theory to the development of practical software measures and specification methodologies. Software specification research uses formal approaches for describing the intended behavior of complex systems. Testing and analysis research involves development and evaluation of approaches for validation and verification of software. Research that spans these areas is ongoing and ranges from theoretical developments, through construction of toolsets that enable application of research results, to empirical evaluation of software engineering techniques.

In addition to research projects in mainstream areas of computing, the department actively seeks to synthesize the knowledge of computing specialists with that of engineers and scientists in a wide spectrum of academic disciplines. Such interaction will stimulate interdisciplinary knowledge production and contribute to the solution of "grand challenges" in such subject areas as general computing, robotics, simulation, manufacturing, computational mathematics, computational biology, computational physics, and computational chemistry.

Research facilities

The department maintains a large network of servers, workstations, and graphics display terminals for graduate study and faculty research. Servers include symmetrical multiprocessors manufactured by Sun. Access to these servers is available in offices and laboratories equipped with over 120 workstations, including Sun workstations, X Window System terminals, PCs, and data terminals. Direct access to the Internet permits communication with computer science researchers worldwide. Programming languages include Ada, C, C++, Concurrent C, FORTRAN-77, Java, LISP, OBJ3, Parlog, Pascal, Prolog, Scheme, and Standard ML. Many other software packages are available, including CASE tools, relational database management systems, simulation, expert systems, graphical user interface builders, and document publishing.

Additional campuswide computer facilities are provided by the university's Computing and Network Services organization, including Sun servers, workstations, and labs throughout campus with PCs, Apple Macintoshes, and data terminals.

Master of science degree

The M.S. degree requires a minimum of 30 credit hours of graduate-level course work. The degree program can take one of three forms: non-thesis-report option requiring 33 hours; a report option requiring 30 hours; and a thesis option requiring 30 hours. An oral presentation is required for each option and further original research is required for the thesis option.

Course work must include a course from each of the following areas:

Implementation: CIS 606, 620, 630, 636, or 690;

Languages: CIS 705, 707, or 771;

Systems: CIS 720, 721, 725;

Structures: CIS 730, 740, or 761;

Theory: CIS 770 or 775;

Specialization: any course numbered CIS 800 or higher except seminar, projects, and research courses.

The student must receive a grade of B or better for each course used to satisfy the above requirements. In addition, the student must complete CIS 897.

Master of software engineering degree

The master of software engineering degree (MSE) enables students who have a computer science, computer engineering, or related engineering or science degree to learn software engineering technology and thus be able to specify, design, implement, document, and maintain large software systems in their specialty areas. The discipline of software engineering covers the application of engineering principles to the building of computer software. The field covers the theories, tools and methods for systematic representation, design, verification, development, production, validation, and maintenance of software products including programs, prototypes, documentation, and user interfaces. Software engineering is applicable not only to computer systems software-the techniques of software engineering offer benefits for software developed for all disciplines.

The program of study for the MSE program consists of 33 credits that must include the following: CIS 740, 748, and 771; one course from CIS 644, 725, 746, and 764; one course from CIS 826, 841, 842, and 864; two courses from an application area such as: parallel and distributed systems, operating systems and real-time systems, database engineering, knowledge-based systems, graphics, or specialty areas from electrical engineering, computer engineering, industrial engineering, mechanical engineering, nuclear engineering, chemical engineering and other areas by special arrangement; CIS 895 (six credits); and six credits of technical electives (computer science or application area courses).

Each student specializes in an application area and does a project related to that application area. Each student will produce and present a "software portfolio" that contains a collection of documents related to the software development activity.

A second course from CIS 644, 725, 746, and 764 may be substituted for CIS 748 for students with professional experience in developing the documents expected in the software portfolio.

Doctor of philosophy

The Ph.D. degree requirements include 90 semester hours of graduate-level credit. A 3.0 GPA must be maintained in all course work used to satisfy the requirements. All work must be completed within seven years.

General requirements include: take and pass a preliminary examination; write a research proposal about the dissertation research; and write and successfully defend the dissertation in an open forum.

Course work requirements include: 24 hours of course credit at Kansas State University beyond the master's degree level; 15 hours must be 800 level or above; one or more courses in theoretical or fundamental topics; and at least 30 hours of Ph.D. research credits.

Admission

The primary admission requirement for the M.S.E. program is a baccalaureate degree in computer science, computer engineering, or a related engineering or science area, with a grade point average of 3.0 or above (junior/ senior years). Applicants with degrees in other areas must have mathematical maturity as demonstrated by courses in logic or discrete mathematics, plus courses in programming, data structures, and algorithms, and either a course or exprience in software engineering.

In addition to the requirements for admission to the M.S.E. program, an M.S. applicant's background must include mainstream computing science, namely block structured and nonprocedural programming languages, architecture, operating systems, database systems, and computing-related mathematics. An applicant must take the GRE verbal, quantitative, and analytical exam; the advanced exam in computer science is recommended. Foreign students must take the TOEFL exam and receive a minimum score of 575.

In addition to the requirements for admission to the M.S. program, an applicant for the Ph.D. program must have a master's degree in computing science or a bachelor's degree plus strong, advanced computing knowledge. Solid preparation in theoretical computer science and advanced knowledge in one or more applications areas (compiling, operating systems, database systems, etc.) are also required.

Computing and information science courses

CIS 500. Analysis of Algorithms and Data Structures. (3) I, II. Analysis of data structures and computer algorithms for trees, lists, graphs, and sets. Measures of performance and complexity of algorithms and structures. Pr.: CIS 300.

CIS 520. Operating Systems. (3) Basic operating systems concepts and services; interrupt processing; processes, concurrency, deadlock, resource scheduling and system structure; resource management: real and virtual storage, input/ output systems, disk scheduling and file systems; design and construction of concurrent programs. Pr.: CIS 350 or EECE 631; and CIS 500.

CIS 521. Real-Time Programming Laboratory. (3) I. Project-oriented introduction to asynchronous processes and related systems software: device drivers, event-driven operations, hierarchical and time-sliced process scheduling, spooling operations, interjob and intermachine communications. Projects will be built on a single-use environment. Pr.: EECE 241 and CIS 350, conc.: CIS 520.

CIS 525. Telecommunications and Data Communication Systems. (3) Basic concepts including OSI 7 layer model, data transmission methods, medium access, link control, connections management; network applications including electronic mail, file transfer, distributed computing, window systems; network management including OSI and Internet management frameworks. Pr.: CIS 300.

CIS 540. Software Engineering Project I. (3) I. Current practices of software development, requirements, design, prototyping, measures and evaluations. Specification, design, and prototyping of a software system. Pr.: CIS 500.

CIS 541. Software Engineering Project II. (3) II. Final implementation, integration, and testing of a software system. Introduction to configuration management, projcct management, and software maintenance. Pr.: CIS 500; CIS 540 (which must be taken in the preceding semester).

CIS 560. Introduction to Data Management Systems. (3) II. Representation of information as data, storage, and manipulation of large amounts of data, logical data models, data storage techniques, data retrieval, integrity, and security. Pr.: CIS 500; CIS 301 or MATH 510.

CIS 570. Theoretical Foundations of Computing. (3) I. Specification and correctness of algorithms, formal languages and automata, introduction to computability, and computational complexity of algorithms. Pr.: CIS 300,MATH 510, and CIS 301.

CIS 580. Numerical Computing. (3) I. Introduction to numerical algorithms fundamental to scientific computer work, including elementary discussion of error, roots of equations, interpolation, systems of equations, quadrature, and introduction to methods for solution of ordinary differential equations. Pr.: CIS 300, MATH 221 and MATH 551.

CIS 591. Computer Science Applications. (3) Programming, program libraries, and design of algorithms. For students with minimal background in computer science. Not for credit by CIS majors. Pr.: Graduate standing in student's own area and knowledge of at least one procedural programming language.

CIS 600. Microcomputer Software. (3) I. Contemporary software packages for microcomputers, including graphics, word processing, spreadsheets, desktop publishing. Events, resources, and the graphical user interface. Student programming project. Pr.: CIS 300.

CIS 604. Set Theory and Logic for CS. (3) Informal and axiomatic set theory, propositional and predicate logic, proof techniques. Pr.: Graduate standing.

CIS 605. Programming Languages. (3) II. History, processors, programming environments; types, scopes and extent, abstraction mechanisms, exceptions and concurrency; functional and object- oriented languages; formal syntax and semantics; structure of compilers for block-structured languages. Pr.: CIS 300.

CIS 606. Translator Design I. (3) Compilers and interpreters, including description of languages, finite state scanners. LL(1) parsing, symbol tables, syntax-directed semantics, simple code generation. Constructing a simple PASCAL compiler. Pr.: CIS 500, and CIS 605.

CIS 620. Operating System Practices. (3) Structure and functions of modern operating systems. Emphasis on reading and modifying the source code of a working operating system. This includes memory management, input/output, process management, file systems, and network interconnection software construction. Pr.: CIS 520.

CIS 625. Parallel Programming. (3) Basic concepts of concurrent and distributed programming; parallel computing architectures; real-time programming; parallel simulation; fault-tolerant programming; partitioning, mapping, and granularity of parallel programming such as communication systems; grid, N-body simulation, and matrix problems; and embedded systems control. Pr.: CIS 500.

CIS 630. AI Programming Techniques. (3) I. Techniques of logic and/or functional programming used in areas of artificial intelligence. Pr.: CIS 605.

CIS 635. Introduction to Computer-Based Knowledge Systems. (3) I. Introduction to the application of artificial intelligence concepts to solving knowledge dcpendent tasks. Review of knowledge- representation ideas. Survey of expert system design. Introduction to existing knowledge-based tools available on personal computers. Development of an intelligent system. Pr.: CIS 300.

CIS 636. Interactive Computer Graphics. (3) I, II. Devices and software for graphics display and user interaction, development of software for direct graphic manipulation applications. Pr.: CIS 300.

CIS 638. Multimedia Systems. (3) II. Introduction to computer graphics devices, user interaction; history and scope; multimedia structure, encoding methods and standards, mark-up and scripting languages, software tools, and applications; readings in current literature; class presentation; multimedia project. Pr.: CIS 300, senior standing.

CIS 640. Software Testing Techniques. (3) II, in alternate years. Survey of software testing methodologies; evaluation of software testing strategies; experience in a variety of software testing practices. Pr.: CIS 540.

CIS 644. Object-Oriented Design and Development. (3) Object models, concepts of classes and objects, dynamic models, comparison of design methods, relationship to object-oriented languages, tools for design and program construction, design and prototype project. Pr.: CIS 300.

CIS 645. Software Development Environments. (3) On sufficient demand. Survey of current development environments and/or an in-depth study of one development environment. Pr.: CIS 500.

CIS 690. Implementation Project. (3) I, II, S. The department will suggest various design or implementation projects for individuals or groups in areas such as translators, interpreters, microprogramming, minicomputer operating systems, graphics, numerical software, etc. Pr.: Junior standing.

CIS 697. Seminar in Computer Science. (1–3) Pr.: Junior standing.

CIS 705. Programming Language Design. (3) Fundamental design principles: abstraction, parameterization, qualification. Lambda-calculus as a metalanguage for design and analysis. The role of data typing, predicate calculus-based typing. Intuitionistic Type Theory. Pr.: CIS 605.

CIS 707. Fundamentals of Algebraic Semantics. (3) Fundamentals of algebraic specification techniques for specifications, initial algebra semantics, the equational calculus, term rewriting, corrections and extension of specifications. Pr.: CIS 500, CIS 604, and CIS 605.

CIS 710. Computer Simulation Experiments. (3) Principles of digital computer simulation; discrete and continuous simulation method, statistics of simulations; implementations. Pr.: CIS 300.

CIS 720. Advanced Operating Systems. (3) Process synchronization and communication, distributed programming primitives, transactions and concurrency control, distributed scheduling, distributed storage, deadlock, security. Pr.: CIS 520.

CIS 721. Real-Time Systems. (3) The design of hard real-time embedded systems, including language and operating system support, scheduling, schedulability analysis, fault-tolerance and design tools. Pr.: CIS 520.

CIS 725. Advanced Computer Networks. (3) Network algorithms: routing and congestion control; protocol engineering: protocol decomposition, specification and verification, synthesis; protocols for high speed networks, parallel implementations, light-weight protocols. Pr.: CIS 520, and CIS 525.

CIS 730. Principles of Artificial Intelligence. (3) Introduction to the fundamental concepts and techniques of AI: problem solving, search and planning, knowledge representation and qualitative reasoning, expert systems, natural language processing and cognitive modeling, computer vision, and maching learning. Pr.: CIS 630.

CIS 736. Computer Graphics. (3) Topics in computer representation and display of images and graphic interaction. Pr.: CIS 636 or EECE 636.

CIS 740. Software Engineering. (3) Software life cycle, requirements, specifications, design, validation, measures, and maintenance. Pr.: CIS 540.

CIS 748. Software Management. (3) Topics related to the management of software, including organization, project planning, process models, life cycle models, TQM, software quality assurance, cost estimation, configuration management. Pr.: CIS 740.

CIS 750. Advanced Computer Architecture Experiments. (3) Characteristics of various computers including those with execution support of multiprocessing, multiprogramming, microprogrammable, highlevel language, stack processing, and communication architectures. Two hours lecture and three hours lab a week. Pr.: CIS 350 or CIS 407.

CIS 761. Data Base Management Systems. (3) Data models and languages, hierarchical, network, relational systems; implementational and operational requirements; programming projects using data base management systems. Pr.: CIS 560, CIS 604.

CIS 762. Office Automation. (3) Characteristics of information work; modeling systems for characterizing aspects of office environment; form-based systems; office automation and description languages, ergonomics, local area networks and tools used in the automation of offices. Pr.: CIS 525, 560.

CIS 764. Database Design. (3) Conceptual, logical, physical, and user interface design for database management systems. Pr.: CIS 500.

CIS 770. Formal Language Theory. (3) Regular languages, finite automata, context-free languages, pushdown automata, context- sensitive languages, linear bounded automata, recursively enumerable languages, Turing machines. Pr.: CIS 570.

CIS 771. Software Specification. (3) Formal logic or specification of software components; algebraic vs. model-based specifications; common abstract types; verification of properties of specifications; introduction to specification of concurrent systems. Pr.: CIS 604.

CIS 775. Analysis of Algorithms. (3) Study and application of techniques and procedures used in the analysis of algorithms including the worst and average cases of both time and space. Study of the P and NP classes. Pr.: MATH 220, CIS 500 and 604.

CIS 798. Topics in Computer Science. (Var.) Pr.: Prerequisite varies with the announced topic.

CIS 801. Translator Design II. (3) LR parsing, storage allocation, code generation, data flow optimization, compiler generators. Pr.: CIS 606.

CIS 806. Semantics of Programming Languages. (3) Introduction of formal semantics description methods for programming languages; comparison of operational, denotational, algebraic, and axiomatic methods; analysis of relationship of formal semantics definitions to computer implementation. Pr.: CIS 771.

CIS 810. Logic Programming. (3) Selected topics; constraint logic programming, deductive databases, concurrent logic programming, object-oriented logic programming, mathematical theory of logic programming specification and transformation of logic programs. Pr.: Knowledge of Prolog.

CIS 820. Topics in Theory of Asynchronous Systems. (3) Safety and liveness properties, synchronous and asynchronous message passing systems, virtual circuit and datagram communication, process failure, concepts of composition and superimposition, temporal logic, reachability analysis, theory of concurrency control, atomic commitment, replica control. Pr.: CIS 720.

CIS 825. Topics in Distributed Systems. (3) Models of distributed computation, events and global states, failure semantics, communication abstractions, synchronization in distributed programs; distributed algorithms: election, termination and deadlock detection, broadcast programming and algorithms. Pr.: CIS 720; or CIS 725 and permission of the instructor.

CIS 826. Protocol Engineering. (3) Basic concepts of protocol design, specification languages and formal description techniques, safety and liveness properties, protocol validation, protocol synthesis, protocol translation and conformance testing. Pr.: CIS 725.

CIS 830. Current Topics in Artificial Intelligence. (3) Advanced techniques and new ideas in artificial intelligence. Includes applications and case studies of artificial intelligence in action. Pr.: CIS 730.

CIS 841. Verification and Validation. (3) Practical techniques for verifying and validating software including formal verification, software testing, reliability measurement and modeling. Pr.: CIS 740.

CIS 842. Specification and Verification of Reactive Systems. (3) Review of formal specification languages; architecture of concurrent and reactive systems; specification methods including: Z, Petri nets, temporal logic, state transition models; development and evaluation of system specifications; verification structures including layered systems, serialization, and predicate automata. Pr.: CIS 771.

CIS 860. Advanced Database Systems. (3) Advanced topics in database and intelligent information systems. Possible topics include active, temporal, object-oriented, and multimedia databases, warehousing and data mining. Pr.: CIS 761 or CIS 764.

CIS 864. Data Engineering. (3) Advanced topics in database design and maintenance including performance monitoring, query optimization and tuning in centralized and distributed data systems. Pr.: CIS 761 or 764.

CIS 870. Theory of Computability. (3) Formal models for computability; universal programs; Church's thesis; unsolvable problems and reducibilities; partial recursive functions; recursive and recursively enumerable sets; s-m-n theorem and the recursion theorem. Pr.: CIS 770.

CIS 890. Special Topics in Computer Science. (2–4) Topics of the current state-of-the-art of computer science. Pr.: Prerequisite varies with the announced topic.

CIS 895. MSE Project. (Var.) This course takes the student through the process of developing a project. This process typically takes more than one semester to complete. Includes reviews and walkthroughs of the requirements, design, and implementation. Pr.: CIS 740, CIS 748, CIS 771, and three additional credits toward the MSE degree.

CIS 897. Seminar in Computer Science. (1) I, II, S. Introduction to computing as a discipline; the relationship of computing to other disciplines; the interaction of computing and ethics; the development of a written and oral research proposal. Pr.: full graduate standing in CIS (CR/NCR only)

CIS 898. Master's Report in CIS. (1–2) Pr.: CIS 897.

CIS 899. Research in Computer Science. (1–6) Pr.: CIS 897.

CIS 901. Topics in Translator Design. (3) Topics involving incremental, extensible, conversational compilers; program development systems, portability and validation of compilers; compiler generators. Pr.: CIS 801.

CIS 905. Theory of Programming Languages. (3) Formal definition languages; operational and formal semantic models; equivalence of semantic models; formal properties of programming languages. Pr.: CIS 806.

CIS 920. Research Topics in Distributed Systems. (3) Topics on current state-of- the-art research in distributed systems. Pr.: Permission of the instructor. CIS 926. Computation Structures. (3) Petri nets, flowgraph schemata, dataflow models, relationships between abstract computational models and hardware models and programming languages. Pr.: CIS 771.

CIS 930. Expert Systems. (3) Advanced theory and techniques in the development of expert systems. Focuses on knowledge acquisition and knowledge organization used in expert systems. Includes design, implementation, and evaluation of an expert system. Pr.: CIS 830.

CIS 940. Research Topics in Software Engineering. (3) Research on one of the topics in CIS 840. May be repeated for credit. Pr.: CIS 840.

CIS 960. Theory of Data Base Systems. (3) Advanced topics in data base systems including distributed data bases, integrity, security, normalization, data base machines, performance models, query languages. Pr.: CIS 840.

CIS 990. Research Topics. (2–3) Study of current topics in computer science. Pr.: Permission of the instructor.

CIS 999. Research in Computer Science. (Var.)

For more information

For additional information and application materials please contact:
Graduate Admissions Secretary
Department of Computing and Information Sciences
Kansas State University
234 Nichols Hall
Manhattan, KS 66506–2302
E-mail: office@cis.ksu.edu
Home page: http://www.cis.ksu.edu/

Counselor Education

See the Student Counseling and Personnel Services section of this catalog for information about the Ph.D. program with an emphasis in counselor education.

Curriculum and Instruction

Two doctoral degrees are offered in curriculum and instruction: the doctor of philosophy and the doctor of education. Advisors for students seeking this degree come from three departments: elementary education, secondary education, and foundations and adult education.

Program description

The Ph.D. in curriculum and instruction is designed for the advanced student who desires to acquire the ability to contribute to the knowledge base of teaching, education, and leadership through a thorough grounding in the conduct of research. The Ph.D. has traditionally been seen as an academic degree because it places emphasis on the usefulness of theory, understanding educational research, and the production of research.

The Ed.D. in curriculum and instruction is designed for the advanced student who wishes to achieve a superior level of competency in his or her professional field with emphasis on practice and leadership. The program provides an understanding of the historical, philosophical, and societal bases of educational practice and the application of research to practice. Traditionally, the Ed.D. has been thought of as a practitioner's degree, appropriate for educators desiring a superior level of competency in the profession. For each degree, there are several areas of emphases: (a) agriculture, business, home economics, and vocational/post-secondary education; (b) diversity, literacy, and social science; (c) media/technology/computers; (d) reading/language arts; (e) science/math/environmental education; and (f) teacher education and curriculum leadership.

Ph.D. program requirements

The student's Ph.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member appointed by the dean of the Graduate School who serves as the chair of the examination committee for the oral defense of the dissertation.

Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and professional goals. Information on the Ph.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements
A minimum of 90 semester hours beyond the baccalaureate degree, including the following:

Area of emphasis (51 hours)
This includes courses in the student's area of academic specialty.

Research courses (9 hours)
This includes research courses concerning methodology consistent with that required for the dissertation. This includes course work on research methods and interpretation of data, experimental design, quantitative analysis, with additional or alternative methodological course work appropriate to advancing the discipline's scholarship through a quality dissertation.

Dissertation research (30 hours)
Completion of a dissertation which examines a topic congruent with the program of study using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency
The Ph.D. residency requires the completion of 24 credit hours within a 12-month period.

Ed.D. program requirements

The student's Ed.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member, appointed by the dean of the Graduate School, from another department within the College of Education who serves as the chair of the examination committee for the oral defense of the dissertation. Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and professional goals. Information on the Ed.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements
A minimum of 94 semester hours beyond the baccalaureate degree, including the following:

Foundations (12 hours)
For each foundations category, take the course listed or its equivalent:

A. Historical and philosophical analysis of educational ideas and practice
EDADL 886 Seminar: Historical and Philosophical Analysis of Education

B. Techniques and interpretation of educational research
EDCEP 816 Research Methods

C. Social science explanations of educating a diverse society
EDCIP 910 Multicultural Curriculum Programming

D. Psychological bases of educational thought and practice
EDCEP 912 Psychological Bases of Educational Thought and Practice

Research courses (6 hours)
Research courses concerning methodology consistent with that required for the dissertation.

Clinical experience (12 hours)

Area of emphasis (48 hours)

Dissertation research (16 hours)
Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency
An academic residency is required for the Ed.D. and can be completed with one of the following options: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six additional hours of coursework completed in one intervening semester; or 24 hours of coursework completed within 12 calendar months.

Preliminary examination
Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study, 3 of which must be over the foundation courses.

For more information

For additional information and application materials, please contact:
Office of Graduate Studies
College of Education
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/

See Education in this catalog for more information.

Dance

See Speech Communication, Theatre, and Dance.

Economics

Head
James F. Ragan, Jr.

Director of graduate studies
Yang-Ming Chang

Graduate faculty
Krishna Rao Akkina, Ph.D., University of Minnesota.
Michael W. Babcock, Ph.D. , University of Illinois-Urbana.
Prasad V. Bidarkota, Ph.D., Ohio State University.
Bernt Bratsberg, Ph.D., University of California, Santa Barbara.
Steven P. Cassou, Ph.D., University of Minnesota.
Yang-Ming Chang, Ph.D., State University of New York at Buffalo.
Patrick J. Gormely, Ph.D., Duke University.
Xiaohua Lu, Ph.D., University of Texas.
Wayne E. Nafziger, Ph.D., University of Illinois–Urbana.
James F. Ragan, Jr., Ph.D., Washington University.
Michael A. Sadler, Ph.D., U. of Texas
Wendy A. Stock, Ph.D., Michigan State University.
Lloyd B. Thomas, Jr., Ph.D., Northwestern University.
Dennis L. Weisman, Ph.D., University of Florida.

Program description

The Department of Economics offers graduate programs leading to the M.A. and Ph.D. degrees. The M.A. degree can be completed in one to two years, and course work for the Ph.D. degree can be completed in three years. The Ph.D. degree also requires passage of preliminary examinations and the completion of a doctoral dissertation.

The graduate program in economics provides a strong foundation in macroeconomic theory, microeconomic theory, and quantitative analysis. In addition, it offers course work by nationally recognized scholars in such fields as development economics, econometrics, international economics, industrial organization, labor economics, and monetary theory and policy. Advanced course work and secondary fields are also available in agricultural economics, computer science, finance, mathematics, political science, statistics, regional planning, and other disciplines.

Admission

In addition to general Graduate School requirements, the Department of Economics has the following requirements for admission.

Course requirements
3 credit hours of intermediate macroeconomic theory
3 credit hours of intermediate microeconomic theory
3 credit hours of statistics
3 credit hours of calculus

If these courses are not part of the student's undergraduate program, admission will be provisional upon completing these courses.

Grade requirements
A 3.0 GPA in the last 60 credit hours taken with no C's, or lower, in the courses listed above. Although students with academic performance below these standards may be

admitted because of other considerations such as high GRE scores, admission will be probationary.

Graduate record examination
Applicants for admission to either M.A. or Ph.D. programs are expected to provide their Graduate Record Examination general test scores.

Master of arts

Required course work
Each master's degree program must consist of at least 30 hours and include courses in microeconomic theory (ECON 720) and macroeconomic theory (ECON 805) along with a course in statistics, unless the student has previously taken a statistics course for graduate credit.

Specific course requirements beyond these core requirements are selected and agreed upon by the student and his or her advisory committee based on the student's background, objectives, and undergraduate preparation. The program may include a minor consisting of 6 to 12 hours of course credit in a single field (outside the Department of Economics).

Degree options
Three options are available to complete the master's degree: thesis option, report option, and Ph.D. qualifying-exam option.

Thesis option: As part of the required 30 hours of course work, the student must complete a master's thesis, for which 6 semester credit hours are given.

Report option: As part of the required 30 hours of course work, the student must complete a master's report for which 2 semester hours of credit are given.

Ph.D. qualifying-exam option: The Ph.D. qualifying-exam option requires successful completion (a grade of B or higher) of a graduate economics course that has as one of its requirements the writing of a term paper, and a master's-level pass in the Ph.D. qualifying exams in microeconomic theory and macroeconomic theory.

Ph.D. degree

Required course work
As part of the 90 hours required for a Ph.D. degree, each Ph.D. degree program must contain the following 30 hours of course work or equivalent:

ECON 735	Mathematical Economics
ECON 805	Income and Employment Theory I
ECON 905	Income and Employment Theory II
ECON 940	Advanced Microeconomic Theory I
ECON 945	Advanced Microeconomic Theory II
ECON 830	Econometrics I
ECON 930	Econometrics II
ECON 810	History of Economic Thought
AGEC 901, 905, 923, or 936	
STAT 706	Basic Elements of Statistical Theory

An additional 30 hours of course work in economics or in related departments are normally required. Students entering the Ph.D. program with a master's degree in economics may receive 30 hours of credit for that degree.

Ph.D. dissertation
In the process of completing the research and writing of a Ph.D. dissertation, the student must enroll in at least 30 hours of ECON 999, Ph.D. Research.

Ph.D. qualifying exams
Students must pass qualifying exams in macroeconomic theory and microeconomic theory. The courses preparing the students for these exams are:

Macroeconomic theory: ECON 805 and ECON 905
Microeconomic theory: ECON 940 and ECON 945

Students are normally expected to take these exams immediately after completing the aforementioned course work.

Preliminary exams must also be passed in two other fields, one of which may be outside of economics. These fields should consist of at least nine hours of course work, and for fields in economics at least six hours must be 800-level or above. Field exams may not be taken until the macroeconomic theory and microeconomic theory exams are passed.

Financial assistance

Graduate research and teaching assistantships provide apprenticeship experiences for future teachers and researchers. Graduate research assistants work with faculty researchers on grant projects. There are two types of graduate teaching assistants: those who teach their own course and those who assist others by grading exams, proctoring, and carrying out other assignments. Teaching assistants receive full waiver of tuition. In addition, the department offers a supplemental award, the Carroll B. Greene Fellowship, to the outstanding female graduate student.

Economics courses

Graduate credit in minor field

ECON 505. Introduction to the Civilization of South Asia I. (3) I. Interdisciplinary survey of the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context, philosophical and social concepts; economic social and political institutions, literature and historical movements. Same as HIST 505, POLSC 505, SOCIO 505, ANTH. 505.

ECON 506. Introduction to the Civilization of South Asia II. (3) II. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages and literature, geography, social and political structures and ideas. Same as HIST 506, POLSC 506, SOCIO 506, ANTH. 506.

ECON 507. The Japanese Economy. (3) II. Analyzes Japan's growth, productivity change, income distribution, government policies, agriculture, industrial structure, labor relations education and technology, and international trade and finance. Emphases will be on U.S.-Japanese competition and comparisons. Pr.: ECON 110.

ECON 510. Intermediate Macroeconomics. (3) I, II, S. An examination of the behavior of the economy as a whole, including an analysis of the national income account, consumption, investment, money, interest, the price, level, the level of employment, monetary and fiscal policy, and economic growth. Pr.: ECON 110; ECON 120 or AGEC 100.

ECON 520. Intermediate Microeconomics. (3) I, II, S. An examination of the theories of consumer behavior and demand, and the theories of production, cost, and supply. The determination of product prices and output in various market structures, and an analysis of factor pricing. Introduction to welfare economics. Pr.: ECON 120.

ECON 521. Intermediate Microeconomic Theory. (3) A mathematical approach to intermediate microeconomics. Emphasis is placed on the use of optimization techniques to examine consumer demand, production and cost, behavior of the firm, market structure and welfare. Pr.: ECON 120; MATH 205 or 220.

ECON 523. Human Resource Economics. (3) II. An introduction to the economic forces influencing wage and employment determination, income differentials, unemployment, and the production and acquisition of human capital. Emphasis on public policy, labor unions, and other relevant institutions. Pr.: ECON 120.

ECON 527. Environmental Economics. (3) II. Economics of environmental market failure and the efficient use of exhaustible and renewable resources. Topics include the application of markets and government policies to greenhouse warming, air and water pollution, and recycling. Pr.: ECON 120.

ECON 530. Money and Banking. (3) I, II, S. Nature, principles, and functions of money; development and operation of financial institutions in the American monetary system, with emphasis on processes, problems, and policies of commercial banks in the United States. Pr.: ECON 110.

ECON 532. Fiscal Operation of State and Local Government. (3) Some I. Designed for students who plan careers related to state or local government. Selected topics in state and local taxation and expenditure. Pr.: ECON 110 and permission of instructor.

ECON 536. Comparative Economics. (3) II. The transition by Russia, Ukraine, Eastern and Central Europe, and Central Asia to market economics; economic reform in China, India, and other countries; and Marxian critiques of capitalism. Pr.: ECON 110 or 120.

ECON 540. Managerial Economics. (3) I, II, Some S. Microeconomic topics applicable to understanding and analyzing firm behavior: optimization, demand, estimation, production, and cost theory. Applications to business problems. Pr.: ECON 120, an introductory-level statistics course, and MATH 205.

ECON 555. Urban and Regional Economics. (3) An examination of the determinants of the economic performance of urban and regional economies, including theory, problems, and policy. Pr.: ECON 120.

ECON 595. Problems in Economics. (Var.) I, II, S. Individual study is offered in international trade, labor relations, money and banking, public finance, transportation, general economics.

Undergraduate and graduate credit

ECON 620. Labor Economics. (3) I, some S. Economics of the labor market—theory and empirical evidence. Labor force composition and trends, labor supply, labor demand, human capital, wage differentials, migration, trade unions, and current issues. Three hours lecture per week. Pr.: ECON 520.

ECON 627. Contemporary Labor Problems. (3) Some II. Emphasis on current research and public policies dealing with such matters as wage inequality, immigration, full employment, poverty, discrimination, social security, health care, minimum wages, and education. Pr.: ECON 510 or 520 or 523.

ECON 630. Introduction to Econometrics. (3) I. An introduction to the analytical and quantitative methods used in economics. Applications to specific problems with an emphasis on computer analyses. Pr.: ECON 120; MATH 205 or 220; STAT 351, 511, or 705.

ECON 631. Principles of Transportation. (3) II. The historical development and economic importance of rail,

motor, air, water, and pipeline transportation in the United States; routes, services, rates, public regulation. Pr.: ECON 110; ECON 120 or AGEC 100.

ECON 633. Public Finance. (3) II. Course seeks answers to questions such as: Which goods should be provided by the private sector and which by the public sector (government)? With what criteria are public expenditures evaluated? What is an equitable and efficient tax system? Who bears the tax burden? What aspects of existing taxes need reform? Pr.: ECON 110; ECON 120 or AGEC 100.

ECON 640. Industrial Organization and Public Policy. (3) II. An examination of measures and determinants of industrial concentration, and an analysis of market structure, conduct, and performance, and policies related to performance. Pr.: ECON 120.

ECON 681. International Economics. (3) I, II, S. Principles of international trade and finance, including production, exchange, commercial policy, resource movements, balance of payments, foreign currency markets, and policies for internal and external balance. Pr.: ECON 110; ECON 120 or AGEC 100.

ECON 682. Economics of Underdeveloped Countries. (3) Factors influencing the economic modernization of the less-developed countries. Emphasis on capital formation, investment allocation, structural transformation, population growth, development planning, and the international economics of development. Pr.: ECON 110.

ECON 686. Business Fluctuations and Forecasting. (3) Some I. Types of business fluctuations; measurement of business cycles; theories of the causes of business cycles; proposals for stabilizing business activity; techniques of forecasting business activity. Pr.: ECON 110; ECON 120 or AGEC 100.

ECON 690. Monetary, Credit, and Fiscal Policies. (3) II. Goals of aggregative economic policy, conflicts among goals, and measures to resolve conflicts; money markets; targets of central bank control; the relative strength of monetary and fiscal policies; rational expectations hypothesis and policy ineffectiveness debate; terms structure of interest rates. Pr.: ECON 530.

ECON 699. Seminar in Economics. (1–3) On sufficient demand. Seminars of special interest will be offered on demand. Pr.: ECON 120.

ECON 720. Microeconomic Theory. (3) I. Demand, cost, and production theories; price and output determination in different market structures; the theory of factor market pricing; an introduction to general equilibrium and welfare analysis. Pr.: ECON 520; MATH 205 or MATH 220.

ECON 735. Mathematical Economics. (3) I. Application of mathematical tools of concrete problems in micro- and macro-economics; mathematical treatment of models of consumption, production, market equilibrium, and aggregate growth. Pr.: ECON 520, MATH 205 or 220, or consent of instructor.

Graduate credit

ECON 801. Topics in Monetary Theory. (3) Emphasis on recent literature of monetary economics; Federal Reserve control of the money stock; the demand for money; money and economic activity; monetary targets and indicators. Pr.: ECON 510 and ECON 530.

ECON 805. Income and Employment Theory I. (3) II. Determination of national income, employment, and the price level. The theories of J. M. Keynes are emphasized along with selected post-Keynesian developments in theories of consumption, investment, money, the interest rate, and the price level. Pr.: ECON 120 and 510.

ECON 810. History of Economic Thought. (3) II, in even years. Development of economic ideas and doctrines and the relation of these to conditions existing when they were formulated. Pr.: ECON 510.

ECON 815. Economic Analysis for Business. (3) II. Microeconomic and macroeconomic theory with selected business applications. Theory of consumer and producer behavior and price determination in individual markets. Theory of aggregate economic behavior and the effects of fiscal and monetary policies. Pr.: ECON 110, ECON 120, and one semester of calculus. Not available for graduate credit in economics.

ECON 823. Advanced International Economics. (3) Theoretical and policy issues related to the international monetary system, capital movements, exchange rate systems, the U.S. balance of payments, and trade of underdeveloped countries. Pr.: ECON 681 or consent of instructor.

ECON 830. Econometrics I. (3) II. Fundamentals of econometric analysis. The classical linear model, multicollinearity, specification error, distributed lags, non-normal disturbances, dummy variables, generalized least squares, autocorrelation, heteroscedasticity. Applications to specific problems. Pr.: ECON 520; MATH 205 or 220; STAT 550.

ECON 832. Public Sector Analysis. (3) Conditions for economic efficiency in the public sector; public good production functions; nonmarket decision making; rationale for public sector growth; systems analysis, cost-benefit and related techniques of allocating public goods. Pr.: ECON 633.

ECON 840. Managerial Economics. (3) I. Economic analysis of production, cost, and demand functions. Application of economic models to managerial decision making. Pr.: ECON 520, MATH 205, and one course in statistics with a prerequisite in the same department.

ECON 860. Growth and Development Theories. (3) Advanced theories of economic growth and development models. Topics include optimum savings, allocations of investment, investment criteria, technical change, programming models, and alternative designs for development policies. Pr.: ECON 682 or consent of instructor.

ECON 890. Seminar in Economics. Course will provide seminars on specific topics in economics. May be repeated for no more than 6 credit hours total. Prerequisites vary with announced subject matter.

ECON 895. Problems in Economics. (Var.) I, II, S. Advanced individual study is offered in selected subject matter. Pr.: Background of courses needed for problems being studied.

ECON 898. Master's Report in Economics.

ECON 899. Master's Research in Economics.

ECON 905. Income and Employment Theory II. (3) I. Aggregative econometric models; dynamic analysis-growth models, the stability of macroeconomic systems. Other current developments in macroeconomic theory. Pr.: ECON 805 or consent of instructor.

ECON 915. Macroeconomic Modelling. Examines current topics in macroeconomics with an emphasis on empirical modelling. The course will be structured to allow the student an in-depth look at influential articles in the literature through presentations and required summary papers, and apply similar skills in an assigned original research paper. Pr.: ECON 730 and ECON 805.

ECON 920. Labor Economics Seminar. (3) A critical analysis of wage theories, collective bargaining, and unemployment problems. Pr.: ECON 620 or consent or instructor.

ECON 925. Location of Economic Activities. (3) An examination of the theory of location including central place theory, location of the individual producer, industrial location patterns, and urban land-use models. Also includes application of theoretical models to current urban problems.

ECON 927. Advanced Labor Economics. (3) An examination of studies in labor supply, labor demand, immigration, and current topics in labor economics. Pr.: ECON 730 (or conc.); ECON 720.

ECON 930. Econometrics II. (3) I. Continuation of Econometrics I. Stochastic regressors, asymptotic results, instrumental variable estimation, systems of equations, dynamic models, maximum likelihood estimation, GARCH models, Cointegration, and other miscellaneous topics in econometrics. Applications to specific problems. Pr.: ECON 830.

ECON 940. Advanced Microeconomic Theory I. (3) II. An examination of demand, production, and cost theories; a discussion of duality theory and the application of the Le Chatelier principle; an analysis of price and output determination in different market structures. Pr.: ECON 520; ECON 735.

ECON 945. Advanced Microeconomic Theory II. (3) I. A study of advanced topics in economic theory, including general equilibrium theory, welfare economics, and risk and uncertainty. Pr.: ECON 940.

ECON 947. Industrial Organization. (3). Theory of industrial organization and its analytical techniques. Game theory; monopoly pricing; product and quality selection; vertical control; static and dynamic theories of oligopoly; product differentiation, price dispersion, and advertising; asymmetric information and strategic behavior. Pr.: ECON 735.

ECON 948. Economics of Regulation. (3). Theory of regulatory economics and its analytical techniques. Principal-agent theory, theories of economic regulation, Ramsey pricing, peak-load pricing, non-uniform pricing, cross-subsidization, rate-of-return regulation, incentive regulation, and regulation in the presence of asymmetric and incomplete information. Pr.: ECON 735.

ECON 955. Theory and Methods of Regional Economic Analysis. (3) A consideration of differences in regional and urban growth; comparison of alternative growth theories; methods of analyzing regional economics such as input-output analysis, linear programming, industrial complex, and spatial interaction models. Pr.: ECON 925 or consent of instructor.

ECON 981. International Trade Theory and Policy. (3). Discussion of recent literature in trade theory and policy under imperfect competition. International trade in imperfectly competitive international markets, strategic trade policies, political economy of trade protectionism, welfare effects of trade liberalization and economic integration, and other issues. Pr.: ECON 735.

ECON 999. Ph.D. Research in Economics.

For more information

For additional information and application materials please contact:

Yang-Ming Chang
Director of Graduate Studies
Department of Economics
Kansas State University
327 Waters Hall
Manhattan, KS 66506–4001
785-532-7357
Fax: 785-532-6919
E-mail: econ@ksu.edu
Home page: http://www.ksu.edu/economics/

Education

See individual programs in this catalog for listing of faculty.

Programs

Graduate programs are offered in adult, occupational, and continuing education; curriculum and instruction; educational administration; educational psychology; elementary education; secondary education; special education; and student counseling and personnel services. Programs leading to the master of science (M.S.), doctor of philosophy (Ph.D.), and doctor of education (Ed.D.) are available. All students pursuing these degrees must be admitted to the Graduate School. These programs prepare individuals for the broad spectrum of educational positions.

Graduate programs are offered through the various departments in the College of Educa-

tion. Primary consideration is given to preparing education students for the various positions in elementary, secondary, postsecondary, occupational, and vocational programs.

Graduate programs are designed for students who require advanced levels of education and advanced degrees for their desired roles in the field of education.

Specializations in education are listed in subsequent portions of this section, with additional details provided in the alphabetically ordered program listing of the catalog.

Assistantships

Graduate assistantships, with nine-month stipends that are similar to those of other Midwest universities, are available on a competitive basis to candidates who are admitted to one of the graduate programs in the College of Education. The graduate student holding an assistantship will be expected to assist with assignments 16–20 hours per week. Students with assistantships are expected to be full-time students.

Students commonly apply for assistantships in the department in which they are seeking their degree, but are not prohibited from applying for an assistantship in other departments for which they have the necessary knowledge and skills. Many departments in the college have graduate assistantships, and some have several openings each year. Primary consideration is given to those pursuing a doctoral degree.

The deadline for applying for an assistantship is usually March 1 with notification to the student by May 1. Applications will continue to be received until all graduate assistantship positions are filled. For more information about assistantships and for an application, contact the Office of Graduate Studies in 17 Bluemont Hall at 785-532-5595.

Financial aid

Information about scholarships, loans, grants, and employment can be obtained in the Office of Student Financial Assistance, 104 Fairchild Hall, 785-532-6420, e-mail: ksufa@ksu.edu.

Certification requiring work beyond the bachelor's degree

The College of Education will recommend for certification individuals satisfying program requirements for the following:

Administrative leadership

A graduate degree is required for any administrative leadership certificate granted by the state of Kansas. The program required by the College of Education must be completed. Eight hours from courses required for the administrator certification must be earned at K-State before the College of Education may recommend administrative certification. The educational administration and leadership faculty should be contacted regarding advisement for specific administrative leadership certification.

There are two administrator endorsements: the building administrator endorsement for the principalship and the district school administration endorsement for the superintendency, which also covers other positions such as special education director.

Building administrator endorsement
This endorsement is for licensure for the principalship. It includes 39 hours of course work. Courses required for this endorsement are the same as those required in the M.S. in educational administration and leadership. Students who already have applicable course work from another degree do not need a second degree in order to qualify for the license. Endorsement requirements are listed here.

Core leadership (12 hours)

EDADL 825	Strategic Leadership in Education (3)
EDADL 827	Political-Community Leadership in Education (3)
EDADL 841	District, Building, and Program Leadership in Education (3)
EDADL 928	Organizational Leadership in Education (3)

Support areas (6 hours)

EDSP 710	Education of Exceptional Individuals (3)
	or
EDSP 886	Seminar in Special Education (3)
EDCEP 715	Principles of Assessment (3)
	or
EDCEP 816	Research Methods (3)
	or
EDADL 886	Seminar in Historical/Philophical Analysis (3)

Building leadership (21 hours)

EDADL 819	Education Finance (3)
EDADL 831	Educational Law (3)
EDADL 835	Principalship (2)
EDADL 855	Administrative Leadership in Curriculum (3)
EDADL 865	Administrative Leadership in Staff Development (3)
EDADL 885	Technology Leadership for Administrators (3)
EDADL 889	Practicum in Educational Administration (1)
EDADL 910	Educational Personnel Administration (3)

District school administrator endorsement
This endorsement is for licensure for the superintendency. It includes 60 hours of graduate course work. Much of this work is also required for building-level licensure. Accordingly, students who already hold a master's degree in educational administration may apply those degree hours toward this license. The course work for this endorsement is listed below:

Core leadership (12 hours)

EDADL 825	Strategic Leadership in Education (3)
EDADL 827	Political-Community Leadership in Education (3)
EDADL 841	District, Building, and Program Leadership in Education (3)
EDADL 928	Organizational Leadership in Education (3)

Support areas (6 hours)

EDSP 710	Education of Exceptional Individuals (3)
	or
EDSP 886	Seminar in Special Education (3)
EDCEP 715	Principles of Assessment (3)
	or
EDCEP 816	Research Methods (3)
	or

District leadership (18 hours)

EDADL 830	Educational Facility Planning (3)
EDADL 834	Strategies for Educational Change (3)
EDADL 836	School-Community Relations (3)
EDADL 986	Advanced Seminar in District/Superintendent Leadership (3)
EDADL 986	Advanced Seminar in Administrative Scholarship (3)
EDADL 986	Advanced Seminar in District Internship (3)

Advanced seminars (9 hours)
Three advanced EDADL seminars must be taken from the following:

EDADL 986	Advanced Seminar in School Business Management (3)
EDADL 986	Advanced Seminar in Community Relations (3)
EDADL 986	Advanced Seminar in Law (3)
EDADL 986	Advanced Seminar in Personnel (3)
EDADL 986	Advanced Seminar in Technology (3)
EDADL 986	Advanced Seminar in Equity: Gender/Ethnicity (3)

Electives (15 hours)
Electives may be taken with approval of the department.

School counseling

The approved M.S. programs in elementary, secondary, vocational guidance, and counseling satisfy the state of Kansas certification requirements. Applicants must hold a degree-teaching certificate and have two years of teaching experience, or one year of teaching experience and one year of field experience (may satisfy these requirements concurrently with the program). A minimum of 12 hours in guidance and counseling required courses must be earned at K-State. Three of the 12 hours must include the course EDCEP 887 Counseling Practicum.

There are two endorsement areas in guidance and counseling: the school counselor endorsement and the vocational education counselor endorsement. Specific requirements for each are listed here.

School counselor endorsement
Students must complete all core requirements and select one of the following options.

Core requirements (30 hours)

EDCEP 715	Principles of Assessment
EDCEP 815	Using Tests in Counseling
EDCEP 816	Research Methods
EDCEP 823	Counseling Theory
EDCEP 852	Career Development for School Counselors
EDCEP 857	Guidance Program Management
EDCEP 877	Practicum in Counseling
EDCEP 858	Group Processes
EDCEP 951	Multicultural Counseling

A course in human growth and development

Elementary school counseling option (6 hours)

EDCEP 856	Guidance in the Elementary School
EDCEP 887	Basic Counseling Internship-elementary level

Secondary school counseling option (6 hours)

EDCEP 822	Principles of Guidance
EDCEP 887	Basic Counseling Internship-secondary level

K–12 school counseling option (12 hours)
Students must complete both EDCEP 822 and EDCEP 856 and a practicum at each level.

Vocational education counselor endorsement
For this endorsement, students must complete the core requirements listed under the school counselor endorsement; document 4,000 hours of non-teaching work experience; and complete the following courses.

EDSEC 620	Principles and Philosophy of Vocational Education
EDSEC 701	Administration and Supervision of Vocational Education
EDSEC 612	Job Analysis
	or
EDSEC 713	Occupational Analysis

Reading specialist

Special certification requirements exist for both elementary and secondary school teachers of special reading classes in Kansas. In addition to degree certification and teaching experience, a minimum of 15 semester hours in a planned sequence of graduate reading courses is required for certification. The College of Education offers a variety of courses which meet these requirements. Students seeking this endorsement must hold a valid Kansas teaching certificate and have two years of verified teaching experience.

Required courses (12 hours)

EDEL 816	Approaches to Reading Instruction
EDEL 840	Reading Assessment
EDEL 841	Instruction of Less-Skilled Readers
EDEL 847	Clinical Practicum in Reading

Elective (3 hours)

EDEL 786	Topic: Literature-Based Reading Instruction
EDEL 786	Topic: Reading-Writing Connections
EDEL 786	Topic: Tradebooks-Elementary and Middle School
EDEL 786	Topic: Whole Language
EDEL 820	Trends in Elementary School Language Arts

Special education

Endorsement can be in one or more of the following areas: mild or moderate disabilities (emotional and behavior disorders, learning disabilities, mental retardation); early childhood special education; and education of gifted. Each program is considered as being primarily one that leads to a master's degree. Specific requirements for these endorsement areas are included in the description for the M.S. in special education. At least half of the credits required for special education endorsement must be earned at K-State, including at least one major course and one practicum, before the College of Education may recommend for special education endorsement.

The special education endorsement can be granted to a person who holds a valid Kansas teaching certificate for the level (i.e., early childhood, elementary, or secondary) of special education preparation. Endorsement for all areas except special education administration can be met without completion of the master's degree. However, most students choose to complete the master's degree while working toward endorsement; completing the master's degree is recommended by the special education faculty. Students who intend to complete a master's degree should apply for admission to the master's program before completing 9 hours of graduate course work.

There are two special education endorsement areas which are not included in the description for the M.S. in special education. These are endorsements for supervisor of special education programs and director of special education. Requirements are listed here.

Supervisor/coordinator of special education programs
This endorsement is available for those with a valid Kansas teaching certificate, full endorsement in the special education area to be supervised, and three years of accredited teaching experience in the area which he or she will be supervising or coordinating. The supervisor/coordinator endorsement also requires a recommendation by the chief school administrator in which the person is employed as supervisor or coordinator.

The required 12 hours of course work focus on leadership, curriculum development, and consultation. The student must successfully complete the following courses for recommendation from Kansas State University:

EDSP 833	Administration of Special Education Programs
EDSP 850	The Consulting Process in Special Education
EDADL 855	Administrative Leadership for Curriculum
EDADL 875	Administrative Leadership in Staff Supervision

Director of special education
This endorsement is available for those who hold or are eligible for full endorsement in a special education area, hold or are eligible for a district school administrator endorsement, and have one of the following: hold or are eligible for a building administrator endorsement, including two years of teaching experience; or hold or are eligible for a special education supervisor endorsement, including two years of teaching experience.

The 24 hours of required course work includes courses in special education and educational administration. An internship is also required. Specific requirements are listed here.

EDADL 819	Educational Finance
EDADL 831	Educational Law
EDADL 836	School-Community Relations
EDADL 910	Educational Personnel Administration
EDSP 833	Administration of Special Education
EDSP 886	Seminar: Special Education
EDSP 991	Internship: Special Education

An elective course

Students will be required to have at least 12 semester hours in three areas of special education other than the one area of full special education certification, and students must meet the minimum of 48 graduate hours.

Early childhood special education
This endorsement is offered through the cooperative efforts of the School of Family Studies and Human Services in the College of Human Ecology and the Department of Special Education in the College of Education. Students choose their department affiliation and are assigned an advisor in the department chosen.

Specific course requirements for the full endorsement in early childhood special education are included in the description of the M.S. in special education.

To obtain provisional endorsement, students must complete the following requirements. The student must have a valid teaching certificate in either early childhood or elementary education. At least 12 hours of the course work required for endorsement must be completed at K-State. The following course sequence must be successfully completed for recommendation for provisional endorsement from Kansas State University:

EDSP 500	Introduction to Human Exceptionality
EDSP 846	Interventions: Early Childhood Special Education
EDSP 885	Practicum in Early Childhood Special Education
FSHS 728	Assessment of Young Children

Mild/moderate disabilities (emotional and behavior disorders, learning disabilities, and mental retardation) provisional endorsement
Requirements for full endorsement for each of these categories are included in the description for the M.S. in special education. For provisional endorsement, the student must have a planned program of study leading to full endorsement and have successfully completed the following courses for recommendation from Kansas State University:

1. Eligible for certification in elementary or secondary education.

2. One of the following courses:

EDSP 323	Exceptional Student in the Secondary School
EDSP 324	Exceptional Child in the Regular Classroom
EDSP 500	Introduction to Human Exceptionality

3. Each of the following:

EDSP 710	Education of Exceptional Individuals
EDSP 842	Intervention: Emotional and Behavior Disorders
EDSP 843	Intervention: Academic Disabilities
EDSP 885	Practicum (in area of specialization)

At least one course in the sequence must be taken each year. The full sequence must be completed by the end of the fourth year.

Gifted (provisional endorsement)
Requirements for full endorsement for gifted are included in the description for the M.S. in special education. For provisional endorsement, the student must have a planned program of study leading to full endorsement and have successfully completed the following courses for graduate credit for recommendation from Kansas State University:

EDSP 750	Introduction to Education of the Gifted
EDSP 847	Curriculum for the Gifted
EDSP 850	Consulting Process in Special Education
EDSP 885	Practicum: Gifted (at the level for which the regular teaching certificate is held)

Speech-language pathologist and school audiologist

The communication sciences and disorders program at K-State meets the requirements

for the certificate of clinical competence of the American Speech–Language–Hearing Association and the Kansas Department of Education requirements for speech-language pathologist and school audiologist. See Family Studies and Human Services–Communication Sciences and Disorders in this catalog for details concerning undergraduate and graduate course requirements leading to this endorsement.

Supervisor

The supervisor endorsement program offered in the College of Education provides course work and practical experience for individuals involved in leadership roles in curriculum and instruction. The supervisor endorsement is developed for department heads, directors of curriculum and instruction, supervisors of elementary or secondary instruction, program coordinators, library/media center supervisors or directors, and other educators in leadership positions. A solid background in program planning, curriculum development, staff supervision, and leadership practice for educators is provided through a combination of courses and internships. Certification recommendation is initiated through the Office of Certification, 13 Bluemont Hall.

There are 21 graduate credits in the program, and requirements are listed below. Substitutions for any course listed here must be approved by the supervisor endorsement coordinator in the College of Education at Kansas State University.

Evaluative, supervisory, and staff development procedures (3 hours)

EDCIP 831	Leadership for Improved Instruction
EDADL 875	Administrative Leadership in Staff Supervision

Student testing and educational accountability systems (3 hours)

EDCEP 715	Principles of Measurement

Curriculum development (3 hours)

EDCIP 803	Curriculum Development
EDADL 855	Administrative Leadership in Curriculum

Addressing a specific curricular or instructional strategy (3 hours)

Several courses which satisfy this standard are listed here, but other courses may also be acceptable. Alternative courses must be approved by the supervisor coordinator.

EDCIP 733	Curriculum Materials for Ethnic Diversity
EDCIP 735	Curriculum Materials for Non-Sexist Teaching
EDCIP 808	Curriculum in the Inner City
EDEL 820	Trends in Elementary School Language Arts
EDEL 821	Contemporary Mathematics in the Elementary School
EDEL 822	Trends in Elementary School Social Studies
EDEL 834	Improving Elementary Science Teaching
EDSEC 840	Curriculum Development in Agriculture I
EDSEC 844	Curriculum Development in Vocational Home Economics
EDSEC 873	The Science Curriculum
EDSEC 874	The Mathematics Curriculum
EDSEC 876	The Social Studies Curriculum in the Secondary School
EDSEC 877	The Foreign Language Curriculum
EDSEC 878	The Language Arts Curriculum

Supervisory implications of the school as a social system (3 hours)

EDCIP 907	Curriculum Theory
EDCIP 910	Multicultural Curriculum Programming
EDADL 834	Strategies for Educational Change
EDADL 886	Seminar: Historical and Philosophical Analysis of Education

Motivational research and its instructional implications (3 hours)

EDCEP 829	Learning Principles for Effective Teaching
EDCEP 912	Psychological Bases of Educational Thought and Practice
EDCEP 920	Advanced Educational Psychology Learning

Directed field experience (3 hours)

EDCIP 991	Internship in Curriculum and Instruction

Admission requirements

Information about application forms, general admission requirements, and specific admission requirements for the master's and doctoral degrees is provided here.

Application forms and information

Information about graduate programs in education and application forms can be obtained from the College of Education Office of Graduate Studies, Bluemont Hall, 785-532-5595, *gradstudy@ksu.edu.*

General admission requirements

Candidates for graduate work shall meet the following admission requirements:

- Graduation from an accredited institution whose requirements for the bachelor's degree are substantially equivalent to those of Kansas State University.
- Undergraduate grade average of 3.0 or better in the junior and senior years. Undergraduate preparation substantially equivalent to that given by K-State in the specific field in which the applicant expects to do graduate work.
- Undergraduate preparation in closely related or supporting subjects adequate to support advanced work in the field of the applicant's choice.

Students lacking preparation in certain areas may be required to do additional work. International students whose native language is not English must make available the results of the Test of English as a Foreign Language. A minimum score of 550 is required on this examination.

Master's degree admission requirements

All students expecting to work for master's degrees shall make available to the Office of Graduate Studies, College of Education, two copies of the graduate school application, two official transcripts from each institution attended, and a statement of academic objectives for graduate study. International students must make available three letters of recommendation. Advisors and/or departments may require additional information. Some departments require a score on the Graduate Record Exam or the Miller Analogies Test; departments requiring a test score are noted on the application form.

Ph.D. and Ed.D. admission requirements

In addition to the general admission requirements, applicants to the Ph.D. or the Ed.D. program in education shall provide to the Office of Graduate Studies, College of Education, two copies of the graduate school application, two official transcripts for undergraduate and graduate courses, and an official record of a score at least at the national mean for education students on the Miller Analogies Test or the verbal and quantitative sections of the Graduate Record Examination. Advisors and/or departments may require additional information.

Ph.D. applicants also need to submit a statement of objectives indicating educational experience and professional goals showing a commitment to a career with responsibilities congruent with those associated with college faculty membership, and three letters of recommendation from higher education faculty members.

Ed.D. applicants also need to submit a statement of objectives indicating educational experience and goals showing a commitment to a career in leadership positions in professional practice, and three letters of reference verifying at least two years of successful, relevant professional experience.

Master of science degrees

Master's degrees offered include:

Adult and continuing education

Elementary education

Educational administration

Secondary education

Student counseling/personnel services

Special education

Master's degree requirements

A minimum of 30 semester hours, approximately one-half of which shall be in the major field.

Academic advisors should be consulted regarding specific departmental program requirements.

Departments shall have the option of using one or more of three plans: (1) a thesis of 6 to 8 semester hours; (2) a written report of 2 semester hours either of research or of problem work on a topic in the major field; or (3) course work only, but including evidence of scholarly effort, such as term papers, production of art, music, designs, as determined by the student's supervisory committee.

A final oral examination and/or a comprehensive written examination shall be required of the student. These may include a defense of the thesis or report, an interpretation of other scholarly products, or a testing of the student's understanding of the fields of study. Choice of examination procedures shall be a departmental option.

Information on special requirements for an advanced degree may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or by writing to the department chair.

Doctor of philosophy degrees in education

Doctor of philosophy degrees in education are offered in the following areas:

Adult and continuing education

Curriculum and instruction

Student counseling/personnel services

The student's Ph.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member appointed by the dean of the Graduate School who serves as the chair of the examination committee for the oral defense of the dissertation.

Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and professional goals. Information on the Ph.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements
A minimum of 90 semester hours beyond the baccalaureate degree, including the following:

Area of emphasis (51 hours)
This includes courses in the student's area of academic specialty.

Research courses (9 hours)
This includes research courses concerning methodology consistent with that required for the dissertation. This includes course work on research methods and interpretation of data, experimental design, quantitative analysis, with additional or alternative methodological course work appropriate to advancing the discipline's scholarship through a quality dissertation.

Dissertation research (30 hours)
Completion of a dissertation which examines a topic congruent with the program of study using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency
An academic residency is required and is satified with 24 hours of credit completed within 12 calendar months.

Preliminary examination
Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study.

Doctor of education degrees

Doctor of education degrees are offered in the following areas:

Adult and continuing education

Curriculum and instruction

Educational administration

Educational psychology

Special education

Student counseling and personnel services

The student's Ed.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member, appointed by the dean of the Graduate School, from another department within the College of Education who serves as the chair of the examination committee for the oral defense of the dissertation. Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and professional goals. Information on the Ed.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements
A minimum of 94 semester hours beyond the baccalaureate degree, including the following:

Foundations (12 hours)
For each foundations category, take the course listed or its equivalent:

A. Historical and philosophical analysis of educational ideas and practice
EDADL 886 Seminar: Historical and Philosophical Analysis of Education

B. Techniques and interpretation of educational research
EDCEP 816 Research Methods

C. Social science explanations of educating a diverse society
EDCIP 910 Multicultural Curriculum Programming

D. Psychological bases of educational thought and practice
EDCEP 912 Psychological Bases of Educational Thought and Practice

Research courses (6 hours)
Research courses concerning methodology consistent with that required for the dissertation.

Clinical experience (12 hours)

Area of emphasis (48 hours)

Dissertation research (16 hours)
Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency
An academic residency is required and can be completed with one of the following options: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six additional hours of coursework completed in one intervening semester; or 24 hours of coursework completed with 12 calendar months.

Preliminary examination
Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study, 3 of which must be over the foundation courses.

Courses

Curriculum, instruction, and policy studies emphasis

Courses in this area address curriculum design, foundations of education, supervision and improvement of instruction, multicultural education, and post-secondary education curriculum and instruction. A number of courses are required as core courses for the master's degrees in elementary education and the master's degree in secondary education. Many of the courses offered in the department are required for the Ph.D. degree or the Ed.D. degree in curriculum and instruction.

General courses

Undergraduate and graduate credit in minor field

DED 500. Topics in Women's Studies. (Var.) I, II, S. Exploration of an interdisciplinary topic in women's studies. Cross-listed with the Dean of Human Ecology and the Dean of Arts and Sciences.

DED 505. Independent Study in Women's Studies. (1–3) I, I. Independent, interdisciplinary, supervised studies in an area of women's studies which does not fall within the boundaries of a traditional department. May be repeated once for credit with change of topic. Pr.: Junior standing, consent of instructor(s), and approval of women's studies faculty.

DED 506. Contemporary Feminist Frameworks. (3) I. Surveys major contemporary U.S. theories of gender and their development, including impact of feminist movement on the development of theory, interactions of race and gender, women's culture, and men's roles. Compares approaches of social sciences and humanities. Pr.: Six semester hours women's studies.

DED 560. Topics in American Ethnic Studies. (1–4) I or II. Selected topics of special interest in American ethnic studies. Repeatable with change of topic. Pr.: DED 160 Introduction to American Ethnic Studies. Cross-listed with the Dean of Human Ecology and the Dean of Arts and Sciences.

Curriculum, instruction, and policy studies courses

Undergraduate and graduate credit in minor field

EDCIP 502. Independent Study in Curriculum, Instruction, and Policy Studies. (1–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

Undergraduate and graduate credit

EDCIP 611. Educational Sociology. (3) I, II, S. A study to gain an understanding of the ways in which the school can effectively use the social process in developing and educating the individual and to show the interrelationships of such institutions as the family, the church, the playgrounds, and the various youth-serving agencies with the school. Pr.: Senior standing.

EDCIP 704. Extra-Class Activities. (3) On sufficient demand. Organization, sponsorship, and objectives of clubs, publications, athletics, dramatics, musical organizations, assemblies, home room, and student council in junior and senior high schools. Pr.: Senior standing or consent of instructor.

EDCIP 706. Aerospace Education Workshop. (3) S. To provide elementary and secondary teachers with knowledge, skills, and attitudes about aerospace activities and the total impact of air and space vehicles upon society. Pr.: EDSEC 586 or teaching experience.

EDCIP 721. Economic Education Workshop. (3) S. Basic economic concepts and how to integrate them into elementary and secondary curriculums and an examination of recent economic education materials. Pr.: Senior standing or higher.

EDCIP 725. The Teacher and Child Abuse. (3) On sufficient demand. An exploration of child abuse and neglect with specific references to legal and moral responsibilities of teaching. Suggestions for detection, reporting, and responsive instruction for suspected cases of child abuse and neglect. Pr.: PSYCH 110 or junior standing.

EDCIP 730. Education of the Disadvantaged. (3) On sufficient demand. Consideration of the life-space of the disadvantaged learner and its relationship to curriculum, organization, and interpersonal relationships in schools. The development of realistic, relevant goals for the teacher of the disadvantaged. Pr.: EDCIP 310 or 611.

EDCIP 733. Curriculum Materials for Ethnic Diversity. (3) On sufficient demand. An examination and analysis of recent materials and practices of schools serving multiethnic student bodies, particularly minorities from disadvantaged backgrounds. Materials include any items used by the school in implementing the curriculum. Pr.: Senior standing or higher.

EDCIP 735. Curriculum Materials for Nonsexist Teaching. (3) II, S. Analysis of recent materials from perspective of concern with their potential for sex-role stereotyping. Examination of teaching resource materials for curriculum intended to facilitate nonsexist teaching. Pr.: Junior standing or higher.

EDCIP 737. Drug Abuse Education. (3) On sufficient demand. Emphasis on the development of effective drug abuse education programs with attention given to the role delineation for schools and teachers. Materials and procedures for developing values and attitudes in an education setting. Pr.: Senior standing.

EDCIP 775. Readings in Curriculum, Instruction, and Policy Studies. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDCIP 786. Topics in Curriculum, Instruction, and Policy Studies. (1–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDCIP 795. Problems in Curriculum, Instruction, and Policy Studies. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

Graduate credit

EDCIP 803. Curriculum Development. (3) I, II, S. An overall view of the entire school curriculum, patterns of organization, outlining of instructional fields, and specific helps in curriculum development for administrators and classroom teachers. Pr.: Twelve hours of education or consent of instructor.

EDCIP 805. Curriculum Construction for Elementary and Secondary Schools. (2–3) On sufficient demand. Procedures for organizing and conducting programs for curriculum improvement in the elementary and secondary schools; techniques for the development and evaluation of curriculum materials. Opportunity is provided for work on individual curriculum problems. Pr.: EDCIP 803.

EDCIP 808. Curriculum in the Inner City. (3) On sufficient demand. Exploration of research and innovations in curriculum and instruction for inner city schools. Emphasis on curricular and instructional difficulties in low-income communities and on productive compensatory educational practices. Pr.: EDCIP 803.

EDCIP 831. Leadership for Improved Instruction. (3) II, S. A consideration of the relationship and techniques involved when teachers, supervisors, and administrators plan and implement improvement of instruction. Pr.: EDEL 585 or EDSEC 586.

EDCIP 832. The Community/Junior College. (3) I. This course is designed to give the student an overview of community/junior colleges. Emphasis on philosophy, purposes, curriculum, organization, professional staff, student-personnel programs, and the role of the comprehensive community junior college in higher education. Pr.: EDCEP 315.

EDCIP 833. Creativity in Education. (3) II, S. Clarification of creativity in education, discovery of creative talent, methods of encouraging creative talent; emphasis on learning models and research in creativity as compared with or contrasted with conformity; emphasis on divergent and convergent thinking and its role in creative teaching with major consideration given to the student's involvement in creative study and/or teaching. Pr.: Teaching experience.

EDCIP 836. Individualized Instructional Programs. (3) On sufficient demand. A study of the rationale, procedures, techniques, and materials which are appropriate and necessary to individualizing instructional programs. Particular emphasis given to organizational structure, curriculum, and administration of nongraded, multigraded, and multiracked programs. Pr.: Teaching experience.

EDCIP 882. Teacher Self-Assessment. (3) I. A systematic study of how teachers can improve their instruction in an autonomous fashion (K–12 and higher education). Major topics include: videotape recording, verbal and nonverbal cues, means-referenced objectives, observation tools, student feedback instruments, and peer feedback. For teachers, administrators, and supervisors interested in improving or assisting people in improving their instruction. Pr.: EDCIP 803 or 943.

EDCIP 886. Seminar in Curriculum, Instruction, and Policy Studies. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDCIP 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDCIP 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDCIP 907. Curriculum Theory. (3) I. Theoretical concepts underlying significant curriculum developments. A systematic critique of current curricular theory. Consideration of model generation. Pr.: EDCIP 803.

EDCIP 908. Instructional Theory. (3) On sufficient demand. Comprehensive analysis of research on the teaching process. Theoretical models for understanding teacher-pupil interaction. The design of studies on factors affecting teacher behavior and classroom learning. Pr.: EDCIP 831 or EDCEP 920.

EDCIP 910. Multicultural Curriculum Programming. (3) I, S. Application of multicultural curriculum principles to total school programming with particular emphasis on the cultural pluralism phenomenon. Includes analytic review of instruments on multicultural/multiracial curriculum evaluation as well as planning skills for equitable thrusts. Primarily involves elementary and secondary focus with some attention to postsecondary programming. Pr.: EDCIP 803 or 808 or equiv.

EDCIP 943. Principles of College Teaching. (3) I, II. Principles of learning, learning theory, educational objectives, methods and techniques, college students, and evaluation in the classroom, Emphasis upon preservice and in-service help in improving instruction at the college level. Pr.: Teaching experience.

EDCIP 944. Current Issues in College Teaching. (2) On sufficient demand. Objectives, problems, and evaluation of college instruction, purpose of the university, creative teaching, student involvement and unrest, and current issues. Individual study of special interest topics. Pr.: EDCIP 943.

EDCIP 979. Community/Junior College Curriculum. (3) I, II, S. Evaluation of community/junior college curricula, reasons for revision, aims and objectives. Designed to familiarize students with the entire curricular offerings of the comprehensive community/ junior college. Pr.: EDCIP 832.

EDCIP 980. The Curriculum Information Consultant. (3) On sufficient demand. The process skills and knowledge needed for the retrieval and dissemination of curriculum information. For teachers and administrators involved with helping others in curriculum development. Pr.: EDCIP 803, 808, or 979.

EDCIP 986. Advanced Seminar in Curriculum, Instruction, and Policy Studies. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDCIP 990. Internship in College Teaching. (2–6) I, II, S. An experiential course for graduate students devoted to improving instruction. Supervised teaching of college classes and seminars in conjunction with cooperating departments. Pr.: Master's degree, EDCIP 943 or 944, and consent of department head.

EDCIP 991. Internship in Curriculum, Instruction, and Policy Studies. (Var.) I, II, S. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of department head.

EDCIP 999. Research in Curriculum, Instruction, and Policy Studies. (Var.) I, II, S. Pr.: EDCEP 817 and/or consent of instructor.

Educational computing courses

Undergraduate and graduate credit in minor field

EDETC 502. Independent Study in Educational Computing. (1–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

Undergraduate and graduate credit

EDETC 718. Microcomputers in Instruction. (2) I, II, S. Trends in computer applications in instruction, major components and functions of microcomputer instructional systems, and use of authoring systems for computer-assisted instruction. Does not prepare the student to teach computer programming. Pr.: EDEL 585 or EDSEC 586.

EDETC 719. Microcomputers in Instruction Lab. (1) I, II, S. Applications of author systems and/or programming languages to design of computer-assisted instruction and other classroom application of microcomputers. One two-hour lab a week. Conc. with EDETC 718. Pr.: CIS 200 and 203.

EDETC 723. Computer Applications in Subject Areas. (1–3) On sufficient demand. Theory and practice of using computer software to enhance teaching and learning in

specific subject areas. Subjects covered will vary. May be repeated for credit in different subject areas. Pr.: EDETC 318 and EDCEP 315.

EDETC 762. Instructional Television. (3) II, alternate S. The principles of instructional television: its development, programming, techniques, and application. Pr.: Junior standing.

EDETC 763. Instructional Design. (3) I, alternate S. Implications of the major theories and models of instructional design to the development of instructional programs. Pr.: EDETC 318 and EDCEP 315.

EDETC 764. Telecommunications in Education. (Var. 2–3) Alternate S. Examination of the relationship of current telecommunications media and hardware to the design of instruction. Pr.: EDETC 318 and permission of instructor or graduate standing.

EDETC 786. Topics in Educational Computing. (1–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDETC 795. Problems in Educational Computing. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

Graduate credit

EDETC 863. Interactive System Design. (3) II, alternate S. Examination of the use of cognitive science as a theoretical base for the design of interactive learning systems. Emphasis on human factors, interactivity, and systems theories. Pr.: EDETC 763.

EDETC 886. Seminar in Educational Computing. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDETC 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDETC 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDETC 920. Design and Evaluation of Educational Software. (3) I, alternate S. Application and analysis of the principles of instructional design as related to educational software. Pr.: EDETC 719 and proficiency in a programming language or authoring system.

EDETC 986. Advanced Seminars in Educational Computing. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

Educational technology courses

Undergraduate and graduate credit

EDTC 502. Independent Study in Educational Computing. (1–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

EDTC 705. Organization and Processing of Instructional Materials. (2) I. Supervisory experiences in cataloging, organization, arrangement, and processing of print and nonprint materials for media centers and libraries. Issues in and approaches to coding and bibliographic concepts are explored. Pr.: EDETC 318 and ENGL 355 and 545.

EDTC 756. Visual Communication. (3) I, alternate S. Implications of visual communication and learning for the design of instructional programs. Pr.: Graduate standing or EDETC 318 and EDCEP 315.

EDTC 765. Planning and Developing Instructional Materials. (3) II, S. The principles and processes involved in planning and producing instructional materials, ranging from the preparation of simple graphic and photographic materials to computer-assisted programmed instruction. Pr.: EDTC 861 or consent of instructor.

EDTC 775. Readings in Educational Technology. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDTC 786. Topics in Educational Technology. (1–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDTC 795. Problems in Educational Technology. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

Graduate credit

EDTC 811. Reference and Information Sources. (3) I, alternate S. Evaluation of print and non-print reference and information sources, reference processes and services, and emerging technologies in reference for school library media centers. Pr.: Graduate standing in library/media specialist program.

EDTC 861. Educational Technology. (2–3) Principles and techniques in the use of visual and audiovisual materials; operation and maintenance of equipment and sources of supply. Pr.: Completion of student teaching or graduate standing.

EDTC 886. Seminar in Educational Technology. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDTC 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDTC 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDTC 911. Optical Information Systems. (3) I, alternate S. Theoretical, practical, and research implications of optical information systems. Includes data conversion, authoring systems, and interface issues in design and implementation for education and training. Pr.: EDETC 718 or consent of instructor.

EDTC 960. Educational Media Programs. (3) On sufficient demand. Organization, administration, and evaluation of educational media service programs, with emphasis on the provision of services, materials, equipment, facilities, staff, and financial resources essential in support of modern instructional programs. Includes studies of programs in varying sizes and types of educational institutions. Pr.: EDETC 861.

EDTC 966. Selecting and Evaluating Instructional Materials. (3) On sufficient demand. Principles and procedures for evaluating graphic, photographic, and audio instructional materials. Development of evaluative criteria, instruments, and utilization guides. Sources for selecting instructional materials. Pr.: EDETC 861.

EDTC 986. Advanced Seminars in Educational Technology. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDTC 991. Internship in Educational Technology. (Var.) I, II, S. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of department head.

EDTC 999. Research in Educational Technology. (Var.) I, II, S. Pr.: EDCEP 817 and/or consent of instructor.

For more information

For additional information and application materials please contact:
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785-532-5595
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Educational Administration and Leadership

Head

David C. Thompson

Graduate faculty

Gerald D. Bailey, Ed.D., University of Nebraska.
Trudy Salsberry, Ph.D., University of Illinois.
Robert J. Shoop, Ph.D., University of Michigan.
G. Kent Stewart, Ed.D., Indiana University.
David C. Thompson, Ed.D., Oklahoma State University.
Alfred P. Wilson, Ed.D., Utah State University.

Program description

The Department of Educational Administration and Leadership offers the master's degree and an Ed.D. in Educational Administration and Leadership. In addition, courses are offered which lead to licensure as a building administrator (principal) or a district school administrator (superintendent). The department cooperates with other parts of the college for other licensure, such as special education directorships.

Admission requirements

See Education in this catalog for information about application forms, general admission requirements, and specific admission requirements for the master's and doctoral degrees.

Master's degree requirements

Core leadership (12 hours)

EDADL 825	Strategic Leadership in Education (3)
EDADL 827	Political-Community Leadership in Education (3)
EDADL 841	District, Building, and Program Leadership in Education (3)
EDADL 928	Organizational Leadership in Education (3)

Support areas (6 hours)

EDSP 710	Education of Exceptional Individuals (3)
	or
EDSP 886	Seminar in Special Education (3)
EDCEP 715	Principles of Assessment (3)
	or
EDCEP 816	Research Methods (3)
	or
EDADL 886	Seminar in Historical/Philosophical Analysis (3)

Building leadership (21 hours)

EDADL 819	Education Finance (3)
EDADL 831	Educational Law (3)
EDADL 835	Principalship (2)
EDADL 855	Administrative Leadership in Curriculum (3)
EDADL 865	Administrative Leadership in Staff Development (3)
EDADL 885	Technology Leadership for Administrators (3)
EDADL 889	Practicum in Educational Administration (I)
EDADL 910	Educational Personnel Administration (3)

Ed.D. requirements

The doctor of education degree is a professional degree program principally for preparing skilled practitioners. Students who do not already hold a district-level (superintendent) endorsement may tailor course work in their emphasis area to meet that license requirement.

The student's Ed.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member, appointed by the dean of the Graduate School, from another department within the College of Education who serves as the chair of the examination committee for the oral defense of the dissertation. Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and goals.

Information on the Ed.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements

A minimum of 94 semester hours beyond the baccalaureate degree, including the following:

Foundations (12 hours)

For each category, take the course listed or its equivalent:

Historical and philosophical analysis of educational ideas and practice

EDADL 886	Seminar: Historical and Philosophical Analysis of Education or other approved course

Techniques and interpretation of educational research

EDCEP 816	Research Methods

Social science explanations of educating a diverse society

EDCIP 910	Multicultural Curriculum Programming

Psychological bases of educational thought and practice

EDCEP 912	Psychological Bases of Educational Thought and Praetice

Research courses (6 hours)

Research courses concerning methodology consistent with that required for the dissertation.

Clinical experience (12 hours)

Area of emphasis (48 hours)

Dissertation research (16 hours)

Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency

An academic residency is required and can be completed with one of the following options: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six additional hours of course work completed in one intervening semester; or 24 hours of course work completed with 12 calendar months.

Preliminary examination

Satisfactory completion of all segments of a monitored, written exam of at least 12 hours over all areas of the program of study, three hours of which must be over the foundation courses.

Educational administration and leadership courses

Undergraduate and graduate credit in minor field

EDADL 502. Independent Study in Educational Administration and Leadership. (I–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

Undergraduate and graduate credit

EDADL 775. Readings in Educational Administration and Leadership. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.:FSHS 110.

EDADL 786. Topics in Educational Administration and Leadership. (I–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDADL 795. Problems in Educational Administration and Leadership. Credit arranged. I, II, S. Selected students are permitted to secure specialized training appropriate to the needs of the individual. The student's project may involve intensive library investigation in a special field or the collection and analysis of data pertinent to a given problem. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of a project. Pr.: Background of courses necessary for the problem undertaken and consent of instructor.

Graduate credit

EDADL 811. Philosophy of Education. (3) I, II, S. A critical analysis of major educational philosophies with discussion of their impact on the problem of education for democracy. Pr.: Twelve hours of education and consent of instructor.

EDADL 813. History of American Education. (3) II. Historical study of the educational endeavor in the United States with special attention to problems that have relevance to contemporary education. Readings, discussion, presentations by instruction leader and students. Pr.: EDCIP 310 or consent of instructor.

EDADL 819. Educational Finance. (3) II, S. An examination of issues relating to the financing of education, including local, state, and federal fiscal support, tax structures, distributional formulas, school finance reform strategies, and budget preparation and administration.

EDADL 825. Strategic Leadership in Education. (3) I, II, S. This course deals with an overview of educators becoming strategic leaders at the program, building, and district levels. Two central thrusts are considered: (1) professional and ethical leadership, and (2) information management and evaluation leadership. Emphasis is placed on knowledge, skills and attributes to identify contexts, developing with others vision and purpose, utilizing information, framing problems exercising leadership processes to achieve common goals, and acting ethically for educational communities.

EDADL 827. Political and Community Leadership in Education. (3) I, II, S. A study of the relationship between the school and the community, with special emphasis on the development of a comprehensive community education program. Organizational patterns, financing, program development, and interaction with other community agencies are analyzed.

EDADL 830. Educational Facility Planning. (3) S. Examination of issues relating to the provision of educational building and other facility needs, including planning, financing, construction, maintenance, and utilization.

EDADL 831. Educational Law. (3) I, S. An examination of the legal status of educational institutions in the United States; the legal rights and responsibilities of cdueators including due process, tort liability, and contracts; student rights; landmark court decisions; federal and state legislation impacting on education, and resources available to assist in developing solutions to legal problems.

EDADL 834. Strategies for Educational Change. (3) I, S. This course provides educators with conceptual knowledge concerning the problems and processes of educational change. Case studies of change are analyzed in the attempt to develop models of educational change.

EDADL 835. The Principalship. (2) I, alternate S. Analysis of the principal's role as he or she interacts with various referent groups. Applicable to both elementary and secondary administration. Pr.: One year of teaching experience.

EDADL 836. School-Community Relations. (2–3) I, S. Interrelationships that exist between the school and the community and the role of the teacher and administrator in such relationships. Pr.: One year of teaching experience.

EDADL 841. District, Building, and Program Leadership in Education. (3) I, II, S. This course deals with an overview of educators becoming leaders of instruction at the district, building, and program level. Four thrusts are being considered (1) instruction, (2) curriculum, (3) staff development, and (4) supervisory leadership. Considerable emphasis is placed on knowledge, skills, and attributes of learning leadership. Themes of planning, conducting, and assessing performance are covered in depth.

EDADL 855. Administrative Leadership in Curriculum. (3) This course identifies the major roles and responsibilities of school administrators in curriculum-related activities. Administrative skills necessary for developing and evaluating the curriculum will be examined.

EDADL 865. Administrative Leadership in Staff Development. (3) I, II, S. This course focuses on the role of the administrator in developing, implementing, and evaluating staff development programs. Superintendent, building-level administrator, and staff development director leadership skills will be analyzed.

EDADL 875. Administrative Leadership in Staff Supervision. (3) This course identifies the major roles and responsibilities of superintendents and building-level administrators as supervisors of staff in a K–12 school district.

EDADL 885. Technology Leadership for Administrators. (3) I, S. A course designed to provide an in-depth analysis of administrator technology leadership skills necessary for integrating technology in education. The roles and technologies of technology leadership will be studied in the context of staff development, supervision, and curriculum articulation. Considerable attention will be given to strategies necessary for creating district and building technology plans.

EDADL 886. Seminar in Educational Administration and Leadership. (Var.) On sufficient demand. Intensive discussion of a problem of current professional interest

based on study of pertinent original literature. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

EDADL 889. Practicum in Educational Administration. (1–3) I, II, S. Supervised on-the-job experience in school administration. Pr.: Consent of instructor.

EDADL 898. Master's Report. (Var.) I, II, S. Pr.: Consent of instructor.

EDADL 899. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor.

EDADL 910. Educational Personnel Administration. (3) II, S. Personnel practices in education are considered along with the implications of collective negotiations and professional accountability for personnel policies.

EDADL 928. Organizational Leadership in Education. (3) I, II, S. This course is an examination of the knowledge, skills, and attributes necessary to understand and improve organizations. It includes implementing plans, managing resources, and applying appropriate processes and procedures in varied educational settings.

EDADL 986. Advanced Seminars in Educational Administration and Leadership. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDADL 991. Internship in Educational Administration and Leadership. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of instructor.

EDADL 999. Research in Educational Administration and Leadership. (Var.) I, II, S. Individual investigation in the field of a student's specialization. Pr.: Sufficient training to carry on the line of research undertaken.

For more information

For additional information and application materials please contact:
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17 Bluemont Hall
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785-532-5595
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E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/

See Education in this catalog for more information.

Educational Psychology

See the Student Counseling and Personnel Services section of this catalog for information about the Ed.D. program in educational psychology.

Electrical and Computer Engineering

Head
David L. Soldan

Director of graduate studies
David L. Soldan

Graduate faculty
Kenneth H. Carpenter, Ph.D., Texas Christian University.
D. V. Satish Chandra, Ph.D., Auburn University.
Dwight D. Day, Ph.D., Oklahoma State University.
James E. DeVault, M.S., University of Michigan.
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Norman G. Dillman, Ph.D., Iowa State University.
Ruth A. Dyer, Ph.D., University of Kentucky.
Stephen A. Dyer, Ph.D., Kansas State University.
Richard R. Gallagher, Ph.D., Iowa State University.
Don M. Gruenbacher, Ph.D., Kansas State University.
William B. Hudson, Ph.D., New Mexico State University.
Donald R. Hummels, Ph.D., Arizona State University.
William B. Kuhn, Ph.D., Virginia Polytechnic and State University.
Donald H. Lenhert, Ph.D., University of New Mexico.
Russell D. Meier, Ph.D., Iowa State University.
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Anil Pahwa, Ph.D., Texas A&M University.
Andrew Rys, Ph.D., Texas Tech University.
Gale G. Simons, Ph.D., Kansas State University.
David L. Soldan, Ph.D., Kansas State University.
Shelli K. Starrett, Ph.D., Iowa State University.

Program description

The Department of Electrical and Computer Engineering offers a master of science in electrical engineering and participates in the College of Engineering doctor of philosophy program. Several areas of specialization are available at the graduate level. Major areas are bioengineering, communications systems, computer engineering, control systems, electromagnetics, power systems, instrumentation, signal processing, and solid-state electronics.

At the master's level there are three options: thesis, report, and course work only. All require a minimum of 30 hours of credit. The Ph.D. program requires 60 hours beyond the master's, including original research of sufficient quality and importance to merit publication in a refereed journal. For information about the Ph.D. program, see the Engineering section of this catalog.

Program requirements

Most incoming students have undergraduate degrees in electrical engineering or computer engineering. Students with backgrounds in physics, mathematics, computer science, and other areas are also accepted into the program. These students may be required to complete undergraduate electrical and computer engineering courses prior to full graduate admission. GRE scores are required for all students who do not have an electrical or computer engineering degree from an ABET-accredited program. Minimum required scores on the GRE are: Verbal 400; Quantitative 600; Analytical 600. A TOEFL score of 600 is required for each applicant whose primary language is not English.

Applications for international students must be received by March 1 for fall admission and September 1 for spring admission.

Research facilities

The department is located in Rathbone Hall. This 100,000-square-foot facility has been designed to provide an excellent academic environment. There are numerous well-equipped instructional and research laboratories including the computer laboratories, signal and image processing laboratory, instrumentation lab, test and measurements laboratory, bioengineering laboratory, energy systems laboratory, and solid-state electronics laboratory.

Extensive computing resources are available to the department. These cover a wide range: PCs, workstations, and special purpose computers. Most of these are connected to networks. K-State's computer center provides service with internet access. Access to supercomputers is also available.

Financial support

Research and teaching assistantships are available on a competitive basis. Most graduate assistants will have both teaching and research responsibilities. Students on four-tenths time assistantships pay in-state fees.

Career opportunities

Graduate study in electrical engineering will prepare engineers to pursue careers in many diverse, high-technology areas. These careers can be in government, industry, or academia. Possible areas of employment are communications systems, medical equipment design, computer design and applications, power generation and distribution, automotive systems, manufacturing systems, and so on. Electricity and electronics are so necessary for our quality of life that it is difficult to find an area in which electrical engineers and computer engineers are not employed.

Electrical and computer engineering courses

Undergraduate and graduate credit in minor field

EECE 501. Electrical Engineering Laboratory I. (2) I, II. Electrical engineering laboratory experiments on topics selected from and correlated with the concurrent or prerequisite courses. Three hours lab a week. Pr.: EECE 241 and 510, STAT 510. Pr. or conc.: EECE 511 and 525.

EECE 502. Electrical Engineering Laboratory II. (2) I, II. Continuation of Electrical Engineering Laboratory I. Three hours lab a week. Pr.: EECE 501, 511, and 525. Pr. or conc.: EECE 526.

EECE 510. Circuit Theory I. (3) I, II, S. An introduction to linear circuit theory; analysis of linear circuits containing resistance, inductance, and capacitance. Three hours rec. a week. Pr.: MATH 222, and PHYS 213.

EECE 511. Circuit Theory II. (3) I, II, S. Analysis of electric circuits using differential equations, state equations, transform techniques and linear algebra. Three hours rec. a week. Pr.: PHYS 214, MATH 240, and EECE 510.

EECE 512. Linear Systems. (3) I, II. An introduction to linear system fundamental concepts and analytical methods. Analytical concepts presented are signal representation and classification, statistical parameters, convolution, Fourier analysis signal sampling, and discrete transforms. Three hours rec. a week. Pr.: EECE 511, and CIS 208 or 209.

EECE 519. Electric Circuits and Control. (4) I, II. Principles of direct-current circuits and machines, alternating-current circuits and machines, electronics, and application to instrumentation and control. Four hours rec. a week. Not open to EECE students. Pr.: PHYS 214.

EECE 525. Electronics I. (3) I, II. Fundamentals of electronic components, devices, and circuits. Three hours rec. a week. Pr.: EECE 510 or 519.

EECE 526. Electronics II. (3) I, II. Continuation of Electronics I. Three hours rec. a week. Pr.: EECE 511 and 525.

EECE 530. Control Systems Design. (3) I, II. Modeling, analysis, and design of control systems. Three hours rec. a week. Pr.: EECE 512.

EECE 535. Control Systems Laboratory. (3) I, II. The design and testing of feedback control systems. Two hours rec. and three hours lab a week. Pr.: EECE 431 and 502. Pr. or conc.: EECE 530.

EECE 541. Design of Digital Systems I. (3) I, II. Design of combinational and sequential systems and peripheral interfaces. Emphasis is placed on hardware description languages, computer-aided design tools, and simulations. Three hours rec. a week. Pr.: EECE 431 and 510, or EECE 431 and PHYS 214.

EECE 543. Computer System Interfacing Lab. (1) I, II. Practical aspects of computer system interfacing including concepts of hardware and software design and debugging. Additionally implementations of interrupts and device drivers will be covered. Three hours lab a week. Pr.: CIS 208 or 209 and EECE 541.

EECE 557. Electromagnetic Theory I. (4) I, II. Vector analysis, electrostatics, magnetostatics, Faraday's Law, Maxwell's Equations, transmission lines, and applications. Four hours rec. a week. Pr.: PHYS 214 and EECE 510.

EECE 571. Introduction to Biomedical Engineering. (1) I. Introduction to quantitative analysis techniques as applied to the study of physiological systems and their associated biological signals. One hour rec. a week. Pr.: MATH 222.

EECE 581. Energy Conversion I. (3) I, II. Energy conversion principles and their application to electric energy converters operating in the static and the dynamic mode. Three hours rec. a week. Pr.: EECE 510 or 519.

EECE 589. Circuits and Machines Lab. (2) I, II. Practical aspects of electrical circuits, transformers, and electrical motors and generators. One hour lec. and two hours lab a week. Not open to EECE students. Pr.: EECE 519.

EECE 590. Seminar. (1) I, II. Preparation and oral presentation of a written technical report. One hour rec. a week. Pr.: ENGL 415 and DEN 275.

Undergraduate and graduate credit

EECE 603. Advanced Electrical Engineering Laboratory. (2) I, II. A project-oriented laboratory in which a small group of students works with a faculty member in a special area of interest. Projects usually involve design, measurement methods, or experimental work. May be repeated once. Pr.: EECE 502.

EECE 624. Power Electronics. (3) I. Theory and application of semiconductor devices to the control and conversion of electric power, control of DC and AC machines, design of electronic power circuits such as inverters, controlled rectifiers, and choppers using diodes, diacs, thyristors, triacs, and power transistors. Three hours rec. a week. Pr.: EECE 511 and 525 and 581.

EECE 628. Electronic Instrumentation. (3) I, II. Applications of electronics in the design of analog and digital systems for the measurement of physical variables and in the transduction of these variables into a useful form for both recording and control. Two hours rec. and three hours lab a week. Pr.: EECE 502 and 526.

EECE 631. Microcomputer Systems Design. (3) I, II. Design and engineering applications of 16 and 32 bit microcomputers to instrumentation and control. Timing and other interfacing problems will be covered. Two hours rec. and three hours lab a week. Pr.: EECE 525 and 431.

EECE 632. Engineering Applications of Microcomputer Systems. (3) I. Elements of digital building blocks and number systems. Computer systems organization, memories, microcomputer fundamentals. Applications of microcomputer systems. Not available for students with credit for EECE 241. Two hours rec. and three hours lab a week. Pr.: PHYS 214; high-level programming language.

EECE 636. Introduction to Computer Graphics. (3) I, II. An introduction to the hardware and software aspects of graphics generation. Programming assignments will provide practical experience in implementing and using standard graphics primitives and user interfaces. Three hours rec. a week. Pr.: CIS 208 or 209 and CIS 300.

EECE 643. Computer Engineering Design Laboratory. (2) I, II. The design and construction of small computer systems covering necessary practical considerations including signal propagation and timing. Three hours lab a week. Pr. or conc.: EECE 543 and 649.

EECE 645. Digital Electronics. (3) I, II. The characteristics and performance of the major contemporary digital logic families. Three hours rec. a week. Pr.: EECE 525, 557, and 541.

EECE 647. Digital Filtering. (3) I. Difference equation characterization of digital filters, transient and steady-state analysis of digital filters using the Z-transform, spectral analysis of digital signals, design and implementation of digital filters. Three hours rec. a week. Pr.: EECE 512.

EECE 649. Computer Design I. (3) I, II. Concepts of computer design. Information representation, instruction sets and addressing modes. Arithmetic and logic unit design for fixed and floating point operations. Hardwired and microprogrammed control design. Concepts of pipelining, CICS and RISC architecture. Memory system design including virtual memory, caches and interleaved memories. I/O design methods, interrupt mechanisms, DMA and system integration. Three hours rec. a week. Pr.: EECE 541.

EECE 659. Wave Guides, Antennas, and Propagation. (3) On sufficient demand. Applications of Maxwell's equations to boundary value problems, guided transmission, cavities, radiation, and propagation. Three hours rec. a week. Pr.: EECE 557.

EECE 660. Communication Systems I. (3) I. Introduction to the analysis and design of analog and digital communication systems. Topics include analog and digital modulation schemes, digital encoding of messages, mathematical modeling of communications systems, noise in communication links and calculation of performance measures for practical links. Three hours rec. a week. Pr. or conc.: EECE 512.

EECE 661. Communication Systems II. (3) II. Analysis and design of digital communication systems. Topics include signal spaces, the derivation of optimum receivers for the white noise channel, modeling of bandpass systems, determination of the power spectrum of a random digital signal, multiple access methods, fading channels, error correction codes, and simulation of practical digital transmission systems. Three hours rec. a week. Pr.: EECE 660.

EECE 662. Design of Communication Circuits. (3) I, II. The design and performance testing of common communication circuits. Topics include tuned amplifiers, impedance matching, oscillators, filters, transmission lines, and phase locked loops. Two hours rec. and three hours lab a week. Pr.: EECE 526 and 502.

EECE 663. Digital Error Control Coding. (3) II in odd years. An introduction to the subject of error-correcting and error-detecting codes, both block and convolutional. Emphasis is placed on practical means of encoding and decoding the most commonly used codes such as Hamming, BCH, and Reed-Solomon codes. Three hours rec. a week. Pr.: EECE 241, STAT 510, and CIS 208 or 209.

EECE 670. Engineering Applications of Machine Intelligence. (3) II. Study of machine intelligence and fuzzy logic concepts and applications in engineering problem domains. As a term project, develop a fuzzy expert system for a specific problem domain that runs on a personal computer and develop the supporting documentation. Three hours rec. a week. Pr.: CIS 200 or 209, and PHYS 214.

EECE 681. Wind Engineering. (3) I. Wind characteristics, turbine performance, synchronous and asynchronous electrical loads, siting, economics, and wind farm design. Three hours rec. a week. Pr.: ME 512 or CE 530; and EECE 525 or 519.

EECE 684. Power Laboratory. (3) II. Introduction to power system and device analysis. Course includes lecture and laboratory experience in aspects of power flow, system operation, power quality, power electronics, and economic analysis. Two hours rec. and three hours lab a week. Pr.: EECE 501, 525, and 581.

EECE 685. Power Systems Design. (3) I. A comprehensive study of modeling of the electric power system components and computer simulation of interconnected power systems in steady state. Vector-matrix descriptions are emphasized. Three hours of recitation a week. Pr.: EECE 581.

EECE 686. Power Systems Protection. (3) II. Analysis of symmetrical and unsymmetrical faults on power systems using symmetrical components technique. Study of protective relaying for protection of power systems against faults. Vector-matrix descriptions and computer solutions are emphasized. Three hours of recitation a week. Pr.: EECE 581.

EECE 690. Problems in Electrical and Computer Engineering. (Var.) I, II, S. EECE 694. Optoelectronics. (3) I. Applied geometric and physical optics, optical radiation, and the interaction of light and matter. The theory and application of photodetectors, lasers, and other photoemitters. Introduction to fiber optical waveguides, sensors, and systems. Three hours rec. a week. Pr.: EECE 525, 557, and CHE 350.

EECE 696. Integrated Circuit Design. (3) I. Study of silicon integrated circuits with emphasis on CMOS analog and digital applications. The course covers basic device structure and modeling, circuit analysis, system design, IC design methodology and economics plus IC fabrication processes. Computer-aided tools are used to simulate and layout circuits designed by student groups. The circuits are fabricated by an external service (MOSIS). Three hours rec. a week. Pr.: EECE 241 and 525.

EECE 725. Integrated Circuit Devices and Processes. (3) II. Integrated circuit fabrication processes including oxidation, diffusion, masking, etching, process monitoring and device characterization. Design of bipolar and MOS circuits through laboratory experiments and computer simulations. Two hours rec. and three hours lab a week. Pr.: EECE 696 and CHE 350.

EECE 728. Mixed Signal Measurements. (3) On sufficient demand. Signal classification, noise and uncertainty, TRMS conversion, quantization and ADCs, repetitive sampling and signal recovery techniques, vector voltmeters, basic network analyzers. Three hours rec. a week. Pr.: EECE 512 or graduate standing.

EECE 730. Control Systems Analysis and Design. (3) II. Use of classical analysis techniques for control system compensation. State space control theory fundamentals are presented in addition to an introductory treatment of several major systems areas. Three hours rec. a week. Pr.: EECE 530 or ME 640. Same as ME 730.

EECE 731. Advanced Microcomputer System Design. (3) II. Design and engineering applications of 16 and 32 bit microprocessors. Utilization of peripheral and co-processor chips. Two hours rec. and three hours lab a week. Pr.: EECE 631.

EECE 736. Discrete-Time and Computer-Control Systems. (3) II. Analysis and design of discrete-time, sampled-data, and computer-control systems using discrete-state equations and Z-transforms. Three hours rec. a week. Pr.: EECE 530 or ME 640.

EECE 742. Data Communications. (3) I, in odd years. The design and testing of popular local area networks for computers. Topics include topologies, media, signalling and modulation, testing, system design and installation. Emphasis on physical and data link layers of the Open System Interface (OSI) model. Three hours rec. a week. Pr.: EECE 512 or CIS 500.

EECE 746. Fault Diagnosis in Digital Systems. (3) II, in even years. Hazards, fault detection in combinational circuits, and sequential machines using path sensitizing and fault-matrix methods, state table analysis, etc.; system reliability through logical redundance. Three hours rec. a week. Pr. or conc.: EECE 541 or 631.

EECE 747. Digital Signal Processing Laboratory. (3) II. Digitization of analog signals; demonstration of aliasing problems; spectral analysis of digital signals using Fourier and other signal representation techniques; digital filtering problems; applications related to biomedical and speech data. Two hours lec. and three hours lab a week. Pr.: EECE 512. Pr. or conc.: EECE 647.

EECE 749. Computer Design II. (3) I. Study of alternate computer hardware structures. Investigation of engineering tradeoffs in implementation of alternative instruction sets and computing structures. Emphasis will be placed on a quantitative approach to cost/performance evaluations including simulation of hardware structures. Three hours rec. a week. Pr.: EECE 649.

EECE 758. Electromagnetic Theory II. (3) On sufficient demand. Continuation of EECE 557. Three hours rec. a week. Pr.: EECE 557.

EECE 771. Control Theory Applied to Bioengineering. (3) II. Development of mathematical models used in the study and analysis of physiological control systems providing techniques for varying pertinent biological parameters. Three hours rec. a week. Pr. or conc.: EECE 530 or ME 640, and a basic physiology course.

EECE 772. Theory and Techniques of Bioinstrumentation. (3) I. Theoretical aspects of biological signals, electrodes, transducers, and processing equipment with emphasis on the acquisition and recording of the responses to electrical potentials, pressure, and flow measurements. Three hours rec. a week. Pr.: EECE 771 or consent of instructor.

EECE 773. Bioinstrumentation Laboratory. (1) I. Practical experience with and evaluations of laboratory and clinical techniques related to electrodes, transducers, and monitoring equipment. Emphasis is on instrumentation for the respiratory, cardiovascular, and nervous systems. Three hours lab a week. Pr.: Conc. enrollment in EECE 772 and AP 773.

Graduate credit

EECE 824. Advanced Power Electronics. (3) High-frequency switching dc/dc converters, resonant converters, analysis and control of power electronic systems, and thermal management. Three hours rec. a week. Pr.: EECE 624.

EECE 828. Topics in Instrumentation. (3) On sufficient demand. Selected topics related to the general field of electronic instrumentation. May be repeated. Three hours rec. a week. Pr.: EECE 628.

EECE 830. Advanced Systems Theory. (3) I. State space description and analysis of continuous and discrete time dynamic systems including optimal control solutions. Both linear and nonlinear systems are considered. Three hours rec. a week. Pr.: EECE 530 or ME 640.

EECE 840. Computer Engineering Methods for Analysis, Simulation, and Design. (3) II. Computer-aided and numerical techniques applicable to problems in electrical and computer engineering. Emphasis is on implementation of these techniques on the computer. Three hours rec. a week. Pr.: EECE 512.

EECE 842. Parallel Processing. (3) I (in odd years). Parallel processing application in signal and image processing. Array processors, pipeline processors, systolic and wavefront arrays, interconnection networks, performance analysis. Three hours rec. a week. Pr.: EECE 512, 649.

EECE 845. Sequential Machines. (3) II. Theory and mathematical framework of digital hardware will be developed. Limitations and fault detection of these machines will be explored using the theoretical basis of sequential machines. Three hours rec. a week. Pr.: MATH 510 and EECE 649.

EECE 846. Computer Engineering Methods for Analysis, Simulation, and Design II. (3) I. Continuation of EECE 840. Pr.: EECE 840.

EECE 849. Topics in Computer Engineering. (3) On sufficient demand. Selected topics relating to current developments in computer engineering. Topics may include computer architectures, computer networking, multiprocessing, and computer interfaces. May be repeated. Three hours rec. a week. Pr.: EECE 649.

EECE 855. Advanced Topics in Electromagnetic Theory. (3) On sufficient demand. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: EECE 758.

EECE 861. Noise Theory. (3) I. Study of noise phenomena and measurement; the representation of noise by statistical parameters, the noise factor of undesired noise sources, and the measurement applications of noise generators. Three hours rec. a week. Pr.: EECE 512.

EECE 866. Transform Processing of Digital Signals. (3) II. Orthogonal transforms in digital signal processing with emphasis on one- and two-dimensional signals, generalized Wiener filtering, feature selection in pattern recognition, and elements of adaptive filtering techniques. Three hours rec. a week. Pr.: EECE 861.

EECE 867. Digital Image Processing. (3) I. Basic concepts and techniques of image formation, representation, analysis, restorations, enhancement, coding, segmentation, and description. Object recognition using shape descriptors and syntactic techniques. Image processing applications in remote sensing, computer vision, and medical diagnosis. Three hours rec. a week. Pr.: EECE 512.

EECE 870. Neural Networks in Engineering. (3) I, in even years. Engineering applications of artificial neural networks and machine intelligence. Particular emphasis will be placed on determining appropriate applications of alternate computing approaches and establishing efficient hardware support to implement these computational approaches. Three hours rec. a week. Pr.: EECE 670.

EECE 881. Advanced Topics in Electric Energy Systems. (3). On sufficient demand. Subjects of current interest such as computer methods, distribution and transmission systems, systems planning and economics, extra high voltage transmission, exotic power sources. May be repeated. Three hours rec. a week. Pr.: EECE 686.

EECE 882. Power Quality. (3) I, II. Description, analysis, modeling, and solution of difficulties relating to distortion of the waveshape in alternating-current power systems. Problems of voltage regulation. Focus on harmonics, noise, filtering, and communications interference in power systems. Three hours rec. a week. Pr.: EECE 624 and 685.

EECE 885. Operation and Control of Electrical Power Systems. (3). On sufficient demand. Specific topics include economic dispatch, unit commitment, control of generation, power system security, and state estimation. Several analytical and computational techniques are used to solve different problems related to above mentioned topics. Three hours rec. a week. Pr.: EECE 685.

EECE 887. Distribution System Engineering. (3) II. Analysis, design and planning of electric distribution systems. Standard terminologies related to distribution systems are covered. Three hours rec. per week. Pr.: EECE 685.

EECE 890. Advanced Electrical Theory. (Var.) I, II. For advanced study in specialized areas by M.S. students. Pr.: M.S. student.

EECE 895. Solid-State Electronic Devices. (3) I, on demand. Introduction to quantum mechanics, crystal structures, and the semiconductor material properties. Diodes, bipolar transistors, and field-effect transistor structures. Analysis of second-order effects in transistors. Three hours rec. a week. Pr.: CHE 350, EECE 557, and EECE 696.

EECE 897. Research in Electrical Engineering. (Var.) I, II, S. Special research problems in electrical engineering. Pr.: Consent of instructor.

EECE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

EECE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

EECE 931. Advanced Topics in Control Theory. (3). On sufficient demand. Study of advanced topics in optimal, time-varying, and stochastic control theory, or other recent developments in the control systems area. May be repeated. Three hours rec. a week. Pr.: EECE 830.

EECE 949. Advanced Topics in Computer Engineering. (3). On sufficient demand. Selected topics related to advanced computer hardware design, performance measurements, sequential machines, and/or advanced computer architectures. May be repeated. Three hours rec. a week. Pr.: EECE 845.

EECE 962. Advanced Topics in Communications. (3), on sufficient demand. Selected topics related to the design and performance analysis of communication systems. Topics may include advanced modulation techniques, optimum receiver design, nonlinear channels, multipath analysis, diversity systems, and others. Three hours rec. a week. Pr.: EECE 861.

EECE 963. Signal Detection Theory. (3) II. A study of optimum signal detection principles for analog and digital communication over the linear additive noise channel. Includes series representations for random signals and the derivation of minimum mean square error (MMSE) receivers for AM and FM and maximum likelihood (ML) receivers for FSK, MSK, and M-Ary PSK. Three hours rec. a week. Pr.: EECE 861.

EECE 965. Information Theory. (3) I. Information as a measure of uncertainty, zero-memory and Markov sources, coding of information sources, channels and mutual information, reliable transmission via unreliable channels, error correcting codes. Three hours rec. a week. Pr.: EECE 861.

EECE 967. Advanced Topics in Digital Signal Processing. (3). On sufficient demand. Selected topics related to adaptive digital filtering techniques; special purpose hardware for digital filtering; two-dimensional signal processing and classification. Three hours rec. a week. Pr.: EECE 866 or 968.

EECE 968. Advanced Digital Filtering. (3) II. Advanced treatment of the theory of digital filtering and digital signal processing. Emphasis is on analysis of random signals. Three hours rec. a week. Pr.: EECE 647 and 861.

EECE 971. Advanced Topics in Bioengineering. (3). On sufficient demand. Study of complex physiological system simulation and analysis techniques, modern experimental and clinical electronic bioinstrumentation systems. Topics selected according to graduate student's interests. May be repeated. Three hours rec. a week. Pr.: EECE 771 or 772.

EECE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head.

For more information

For additional information and application materials please contact:
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Elementary Education

Head
V. Ray Kurtz

Graduate faculty
Jennifer M. Bay, Ph.D., University of Missouri.
Paul R. Burden, Ph.D., Ohio State University.
Jana R. Fallin, Ph.D., University of Texas.
Marion J. Goldston, Ph.D., University of Georgia.
Marjorie Hancock, Ed.D., Northern Illinois University.
Mary F. Heller, Ed.D., Oklahoma State University.
Socorro Herrera, Ph.D., Texas Tech University.
V. Ray Kurtz, Ed.D., University of Nebraska.
Michael F. Perl, Ph.D., University of South Carolina.
Margaret Gail Shroyer, Ph.D., Kansas State University.
Ben A. Smith, Ed.D., University of Georgia.
John R. Staver, Ed.D., Indiana University.

Program
The Department of Elementary Education offers a variety of graduate-level courses in all curricular areas with specific emphasis upon trends and recent developments in practice, theory, and research. These courses are offered on-campus, at selected off-campus sites, and via distance learning.

This department supports the following degrees: the master of science in elementary education, the doctor of education in curriculum and instruction, and the doctor of philosophy in curriculum and instruction. In all of these programs, breadth of study is stressed with students taking courses in other departments in the College of Education and the university.

The department offers numerous short courses, workshops, and seminars in addition to courses in the catalog. These can be applied to degree programs or taken for personal or professional development unrelated to a degree program.

Admission requirements
See Education in this catalog for information about application forms, general admission requirements, and specific admission requirements for the master's and doctoral degrees.

M.S. requirements
Curriculum
Curriculum (At least 3 hours.)
EDCIP 803 Curriculum Development
Or a curriculum course approved by the advisor.

Instructional improvement (At least 3 hours.)
EDEL 786 Topic: Classroom Management and Discipline
EDEL 786 Topic: Enhancing Instruction Through Technology
EDCIP 833 Creativity in Education
EDCIP 836 Individualized Instructional Programs
EDCIP 882 Teacher Self-Assessment
EDCEP 715 Principles of Assessment
EDETC 718 Microcomputers in Instruction (2 hours)
EDETC 719 Microcomputer in Instruction Lab (1 hour)
Or an instructional improvement course approved by the advisor.

Research (At least 3 hours.)
EDCIP 831 Leadership for Improved Instruction
EDCEP 816 Research Methods
EDEL 786 Topic: Teacher as Researcher
Or a research course approved by the advisor.

Multicultural education (At least 3 hours.)
EDCIP 730 Education of the Disadvantaged
EDCIP 733 Curriculum Materials for Ethnic Diversity
EDCIP 735 Curriculum Materials for Non-Sexist Teaching
EDCIP 808 Curriculum in the Inner City
EDCIP 910 Multicultural Curriculum Programming
Or a multicultural education course approved by the advisor.

Area of specialization (15 hours; select one of the following three options)
Multiple subject areas (at least 15 hours having EDEL prefixes)
(1) Core (at least three courses from the core)
EDEL 816 Approaches to Reading Instruction
EDEL 820 Trends in Elementary School Language Arts
EDEL 821 Contemporary Mathematics in the Elementary School
EDEL 822 Trends in Elementary School Social Studies
EDEL 834 Improving Elementary Science Teaching

(2) Electives
EDEL 779 Primary School Education
EDEL 780 Kindergarten Education
EDEL 786 Topic: Assessment in Reading/Language Arts
Other electives approved by the advisor

Reading/language arts (at least 15 hours)
EDEL 786 Topics: Reading-Writing Connections
EDEL 786 Topics: Whole Language
EDEL 786 Topics: Tradebooks in Elementary/Middle School
EDEL 786 Topics: Assessment in Reading/Language Arts
EDEL 816 Approaches to Reading Instruction
EDEL 817 Reading Comprehension
EDEL 820 Trends in Elementary School Language Arts
EDEL 840 Reading Assessment
EDEL 841 Instruction of Less-Skilled Readers
EDEL 847 Clinical Practicum in Reading
EDSEC 715 Reading in the Content Areas

Multicultural/urban education
This specialization is only for students enrolled in the Kansas City master's program.

EDCIP 611 Educational Sociology
EDCIP 725 The Teacher and Child Abuse
EDCIP 737 Drug Abuse Education
EDCIP 886 Seminar: Mental Health and the Curriculum
EDEL 816 Approaches to Reading Instruction
EDETC 756 Visual Communication
EDSEC 811 Consumer Education
Or other courses approved by the advisor.

Note: Students selecting this specialization must also complete an additional six hours of the following course to work on their research paper: EDEL 795 Problems in Urban Curriculum

Classroom technology specialty (At least 21 hours)
All courses in this specialization will be offered in the Manhattan area on weekends, in short formats in the summer, or by distance education. To enter the classroom technology specialty, an educator must have: a current teaching certificate and classroom teaching experience or equivalent; experience in using a contemporary desktop or personal computer; word processing applications appropriate to grade level being taught; regular access to a computer; access to the internet; and have a commitment toward developing strategies to enhance curriculum and resulting student learning experiences through various uses of information technologies.

(1) Required (At least 11 hours)
EDADL 786 Topic: Educational Change, Technology Integration, and the Future (2hrs.)
or
EDADL 834 Strategies for Educational Change (3hrs.)
EDEL 786 Topic: Enhanced Instruction Through Technology (3hrs.)
EDEL 786 Topic: Classroom Technology Institute (1–3 hrs.)
EDEL 795 Problems: Technology Project/Portfolio (2hrs.)
EDEL 886 Seminar: Current Research and Practice in Classroom Technology (2 hrs.)
EDCIP 786 Topic: Redefining Assessment (1–2 hrs.)

(2) Electives (10 hours)
A variety of 786 topics courses or 886 seminar courses are regularly planned to address classroom applications of emerging technologies such as IBM-compatible or Macintosh multimedia, electronic research, desktop publishing, integrated technology curriculum, web technologies for the classroom, and electronic portfolios.

English as a second language (ESL) program
EDCIP 733 Curriculum Materials for Ethnic Diversity
EDEL 786 Topic: Culturally Sensitive ESL Methods and Instructional Management
EDEL 786 Topic: Culturally Competent Assessment and Intervention for the Culturally and Linguistically Different Student
EDEL 786 General and Applied Issues in Linguistics and Second Language Acquisition
EDEL 786 Topic: Practicum in ESL
Or other courses approved by the advisor.

Electives
Report or thesis
If a student selects a master's report or thesis, the minimum number of credits are shown here.

898 Master's Report (if selected, 2 hours)
899 Master's Thesis (if selected, 6-8 hours; 6 hours minimum)

Elementary education courses
Undergraduate and graduate credit in minor field
EDEL 502. Independent Study in Elementary Education. (1–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

EDEL 585. Teaching Participation in the Elementary School. (Var) I, II. Observation and teaching participation under the direction of selected elementary teachers. Pr.: EDEL 300, 470, 471, 472, 473, 474, and admission to student teaching. Conc. successful completion of EDEL 600 required.

Undergraduate and graduate credit
EDEL 600. Reading with Practicum. (3) I, II. Supervised observation and teaching of reading in approved school classrooms. Pr.: EDEL 474 or teaching experience. May not apply to reading specialist endorsement.

EDEL 717. Corrective Reading Instruction. (1–3) On sufficient demand. Supervised tutoring of children with reading difficulties. Not open to students with credit in EDEL 847. Pr.: Student teaching experience.

EDEL 720. Foreign Language Methods of Elementary Schools. (3) On sufficient demand. Methods of teaching and organization of materials for the foreign language program in the elementary school. Pr.: EDCEP 315, 24 hours in the foreign language, and conc. enrollment in either Preprofessional Lab (DED 100, 1 cr.) or Teaching Participation in the Elementary School (EDEL 585, 4 cr.)

EDEL 739. Environmental Education. (1–3) On sufficient demand. The selection, adaptation, and development of environmental education K–12 curriculum materials: procedures for an integrated curricular implementation; the selection of appropriate instructional strategies. Pr.: A course in environmental studies.

EDEL 775. Readings in Elementary Education. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDEL 779. Primary School Education. (3) On sufficient demand. A course for those interested in the kindergarten and primary school child. Emphasis will be placed on curriculum development, pertinent research, and innovative practices in early education. Pr.: EDCEP 315.

EDEL 780. Kindergarten Education. (3) On sufficient demand. A specialized study of the kindergarten in the American school: methods and materials for working with the kindergarten child, including communication and explanation skills and readiness for reading. Pr.: FSHS 110, EDEL 300, and junior standing.

EDEL 786. Topics in Elementary Education. (1–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDEL 795. Problems in Elementary Education. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing.

Graduate credit

EDEL 814. Understanding and Teaching Reading. (3) On sufficient demand. Foundational issues in K–12 reading instruction. Focus on the reading process, the nature of the learner, the text, and the instructional setting. Pr.: EDEL 585 or EDSEC 586.

EDEL 816. Approaches to Reading Instruction. (3) On sufficient demand. A critical study of approaches, materials, and methods for effective reading instruction. Pr.: EDEL 585, EDSEC 582, or EDSEC 586.

EDEL 817. Reading Comprehension. (3) On sufficient demand. Reviews comprehension theory and research; explores strategies for developing reading comprehension in readers. K–12; examines evaluative devices for assessing comprehension abilities. Pr.: EDEL 600 or EDSEC 715.

EDEL 820. Trends in Elementary School Language Arts. (3) On sufficient demand. An analysis of current methods, issues, and trends in teaching, speaking, listening, and writing through the study of significant literature and research findings. Pr.: Teaching experience.

EDEL 821. Contemporary Mathematics Education in the Elementary School. (3) On sufficient demand. Advanced study of selected topics in elementary school mathematics emphasizing new programs, trends, controversial topics, and new recommendations for persistent problems; findings of recent research stressed. Pr.: Teaching experience.

EDEL 822. Trends in Elementary School Social Studies. (3) On sufficient demand. Current methods, materials, issues, and trends in developing social consciousness among elementary school children. Social science strategies usable by children. Pr.: Teaching experience.

EDEL 825. Creative Language Expression in the Elementary School. (3) On sufficient demand. Developing experiences in creative expression as part of the elementary school English language arts program; role of the arts in fostering creative language expression, strategies for teaching and evaluating creative writing and dramatic arts. Pr.: EDEL 471.

EDEL 834. Improving Elementary Science Teaching. (3) On sufficient demand. Evaluation and implementation of psychological and philosophical foundations will be stressed in improving elementary science teaching. Recent materials will be compared and their unique and common elements examined. Pr.: Teaching experience.

EDEL 835. Supervision of Student Teaching. (3) II. Organization and functions of student teaching programs; orienting, supervising, and evaluating student teachers in elementary and secondary schools. Pr.: Teaching experience.

EDEL 840. Reading Assessment. (3) On sufficient demand. A survey of the principles, procedures, instruments, and programs for assessing reading achievement in the classroom and resource room. Special attention to less-skilled readers. Pr.: EDEL 816 or EDCEP 715 or EDSEC 763 and student teaching.

EDEL 841. Instruction of Less Skilled Readers. (3) On sufficient demand. A study of selected theories, approaches, materials, and organizational plans for instructing students having problems learning to read. Pr.: EDEL 816 or 840 or EDSP 763 and student teaching.

EDEL 845. Advanced Elementary School Reading. (3) On sufficient demand. A study and evaluation of selected theories, programs, practices, and materials, K–6, emphasizing current trends, issues, and problems. Pr.: EDEL 474.

EDEL 846. Diagnosis and Treatment of Reading Disabilities. (3–4) On sufficient demand. A systematic study of the causes of reading problems, the use and interpretation of diagnostic instruments and procedures, and special materials and methods of remedial instruction. Includes diagnosis of a child with a reading problem. Pr.: EDEL 715 or EDEL 845 and teaching experience.

EDEL 847. Clinical Practicum in Reading. (3) S. Supervised experience in diagnosing and teaching students with reading problems. Pr.: EDEL 840 and 841.

EDEL 848. Organization and Administration of Reading Programs. (2) On sufficient demand. An investigation of several topics of special interest to educators responsible for developing a total reading program, K–12, with special attention to the remedial reading program. Pr.: EDSEC 715 or EDEL 845.

EDEL 849. Directed Professional Development/ Elementary. (5) On sufficient demand. Research and teaching under supervision in the elementary school. Open only to outstanding liberal arts graduates enrolled in the special program for the professional preparation of such graduates for teaching in critical areas in elementary schools. Pr.: Registration in Graduate School.

EDEL 886. Seminars in Elementary Education. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDEL 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDEL 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDEL 972. Advanced Study of the Reading Process. (3) On sufficient demand. Survey of selected theories of the reading process. Investigation of the interrelationships of the reading act: cognitive processes; language; social-emotional factors; and experience. Emphasis upon recent developments in the field. Pr.: EDEL 845 or EDSEC 715.

EDEL 986. Advanced Seminars in Elementary Education. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDEL 991. Internship in Elementary Education. (Var.) I, II, S. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of department head.

EDCI 999. Research in Elementary Education. (Var.) I, II, S. Pr.: EDCEP 817 and/or consent of instructor.

For more information

For additional information and application materials please contact:
Office of Graduate Studies
College of Education
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/Departments/ElemEd/Overview.html
Education home page: http://www.educ.ksu.edu/

Engineering

Indepartmental graduate program

The graduate faculty of the College of Engineering offers doctoral programs leading to the Ph.D. in engineering in the departments of biological and agricultural engineering, chemical engineering, civil engineering, electrical and computer engineering, industrial and manufacturing systems engineering, and mechanical and nuclear engineering.

The graduate committee of the College of Engineering coordinates the graduate programs leading to the Ph.D. in engineering. The committee consists of a representative from each academic department of the college. The primary function of the committee is to administer the graduate program policies established by the College of Engineering graduate faculty and the Graduate School.

In addition, these departments offer graduate programs leading to the master of science degree. The master's degree is also offered in architectural engineering with emphasis in building systems study.

Additional detail is presented in the alphabetically ordered listings of these programs in this catalog. Entering graduate students must meet the entrance requirements of the Graduate School and must have completed the B.S. degree in a field of engineering or a closely related area of science.

Graduate faculty

Richard G. Akins, Chemical Engineering, Ph.D., Northwestern University.

Daniel Andersen, Computing and Information Sciences, Ph.D., University of California, Santa Barbara.

Farhad Azadivar, Industrial and Manufacturing Systems Engineering. Dir. of Advanced Manufacturing Inst. Ph.D., Purdue University.

Stephen M. Bajorek, Mechanical and Nuclear Engineering, Ph.D., Michigan State University.

B. Terry Beck, Mechanical Engineering, Ph.D., Oakland University.

David Ben-Arieh, Industrial and Manufacturing Systems Engineering, Ph.D., Purdue University.

Alok Bhandari, Civil Engineering, Ph.D., Virginia Polytechnic Institute and State University.

Charles R. Bissey, Architectural Engineering, MArch Kansas State University.

Charles L. Burton, Architectural Engineering, Construction Science, MS, University. of Kansas.

Myron A. Calhoun, Computing and Information Sciences, Ph.D., Arizona State University.

Kenneth H. Carpenter, Electrical and Computer Engineering, Ph.D., Texas Christian University.

D.V. Satish Chandra, Electrical and Computer Engineering, Ph.D., Auburn University.

Cheng S. Chang, (Adjunct) Biological and Agricultural Engineering, Ph.D., North Carolina State University.

Shing I. Chang, Industrial and Manufacturing Systems Engineering, Ph.D., Ohio State University.

Kirby S. Chapman, Mechanical Engineering, Ph.D., Purdue University.

Do Sup Chung, Biological and Agricultural Engineering, Ph.D., Kansas State University.

Gary Clark, Biological and Agricultural Engineering, Ph.D., Texas A&M University.

Peter B. Cooper, Civil Engineering; Ph.D., Lehigh University.

Dwight D. Day, Electrical Engineering and Computer Engineering, Ph.D., Oklahoma State University.

John J. Devore, Electrical and Computer Engineering, Ph.D., Kansas State University.

Norman G. Dillman, Electrical and Computer Engineering, Ph.D., Iowa State University.

Floyd E. Dowell, (Adjunct), Biological and Agricultural Engineering, Ph.D., University of Illinois.

Matthew Dwyer, Computing and Information Sciences, Ph.D., University of Massachusetts, Amherst.

Ruth A. Dyer, Electrical and Computer Engineering, Ph.D., University. of Kentucky.

Stephen A. Dyer, Electrical and Computer Engineering, Ph.D., Kansas St. University.

Steve J. Eckels, Mechanical Engineering, Ph.D., Iowa State University.

N. Dean Eckhoff, Nuclear Engineering, Ph.D., Kansas State University.

James H. Edgar, Chemical Engineering, Ph.D., University of Florida.

Larry E. Erickson, Chemical Engineering, Ph.D., Kansas State University.

L. T. Fan, Chemical Engineering; Dir, Ph.D., West Virginia University.

Richard E. Faw, Nuclear Engineering, Ph.D., University of Minnesota.

Donald L. Fenton, Mechanical Engineering, Ph.D., University of Illinois.

Richard R. Gallagher, Electrical and Computer Engineering, Ph.D., Iowa St. University.

Stevin H. Gehrke, Head and Chemical Engineering, Ph.D., University of Minnesota.

Larry A. Glasgow, Chemical Engineering, Ph.D., University of Missouri–Columbia.

Peter J. Gorder, Mechanical Engineering, Ph.D., University of California, Davis.

Don M. Gruenbacher, Electrical and Computer Engineering, Ph.D., Kansas State University.

David A. Gustafson, Computing and Information Sciences, Ph.D., University of Wisconsin.

Lawrence J. Hagan, (Adjunct) Biological and Agricultural Engineering, Ph.D., Kansas State University.

William J. Hankley, Computing and Information Scienees, Ph.D., Ohio State University.

Joseph P. Harner, III, Biological and Agricultural Engineering; Ph.D., Virginia Polytechnical Institute and State University.

R. Michael Harnett, Industrial and Manufacturing Systems Engineering, Ph.D., University of Alabama.

John Hatcliff, Computing and Information Sciences, Ph.D., Kansas State University.

Richard B. Haytcr, Architectural Engineering, Ph.D., Kansas St. University.

Mohammad H. Hosni, Mechanical Engineering, Ph.D., Mississippi State University.

Mustaque Hossain, Civil Engineering, Ph.D., Arizona State University.

Rodney Howell, Computing and Information Sciences, Ph.D., University of Texas–Austin.

Kuo-Kuang Hu, Civil Engineering, Ph.D., Kansas State University.

William B. Hudson, Electrical and Computer Engineering, Ph.D., New Mexico State Univcrsity.

Donald R. Hummels, Electrical and Computer Engineering, Ph.D., Arizona State University.

Michael Huth, Computing and Information Sciences, Ph.D., Tulane University of Louisiana.

Byron W. Jones, Joint Appointment with Architectural Engineering and Mechanical Engineering, Ph.D., Oklahoma St. University.

Pransata K. Kalita, Biological and Agricultural Engineering, Ph.D., Iowa State University.

Atul Kelkar, Mechanical Engineering, Ph.D., Old Dominion University.

Terry S. King, Chemical Engineering, Ph.D., Massachusetts Institute of Technology.

James K. Koelliker, Head and Biological and Agricultural Engineering, Ph.D., Iowa St. University.

Bradley A. Kramer, Head and Industrial and Manufacturing Systems Engineering, Ph.D., Kansas State University.

Prakash Krishnaswami, Mechanical Engineering, Ph.D., University of Iowa.

William B. Kuhn, Electrical and Computer Engineering, Ph.D., Virginia Polytechnic Institute and State University.

Benjamin G. Kyle, Chemical Engineering, Ph.D., University of Florida.

Jerome P. Lavelle, Industrial and Manufacturing Systems Engineering, Ph.D., North Carolina State University.

Kevin B. Lease, Mechanical Engineering. Ph.D., University of Iowa.

E. Stanley Lee, Industrial and Manufacturing Systems Engineering, Ph.D., Princeton University.

Donald H. Lenhert, Electrical and Computer Engineering, Ph.D., University of New Mexico.

Sameer I. Madanshetty, Mechanical Engineering, Ph.D., Yale University.

Ronaldo Maghirang, Biological and Agricultural Engineering, Ph.D., Pennsylvania State University.

Kyle R. Mankin, Biological and Agricultural Engineering, Ph.D., Ohio State University.

Alexander P. Mathews, Civil Engineering, Ph.D., University of Michigan, Ann Arbor.

Russell D. Meier, Electrical and Computer Engineering, Ph.D., Iowa State University.

Hani G. Melhem, Civil Engineering, Ph.D., University of Pittsburgh.

Hui Meng, Mechanical Engineering, Ph.D., University of Houston.

Ruth Douglas Miller, Electrical and Computer Engineering, Ph.D., University of Rochester.

Masaaki Mizuno, Computing and Information Sciences, Ph.D., Iowa State University.

Medhat M. Morcos, Electrical and Computer Engineering, Ph.D., University of Waterloo.

Steve Moser, Architectural Engineering, MS, Colorado University.

Yacoub Najjar, Civil Engineering, Ph.D., University of Oklahoma.

Mitchell Neilsen, Computing and Information Sciences, Ph.D., Kansas State University.

Richard G. Nelson, Engineering Extension, Ph.D., Oklahoma State University.

David A. Pacey, Engineering Tech. Ph.D., Kansas State University.

Anil Pahwa, Electrical and Computer Engineering, Ph.D., Texas A&M University.

Rohert J. Peterman, Civil Engineering, Ph.D., Purdue University.

Lakshmi N. Reddi, Civil Engineering. Ph.D., Ohio State University.

Danny H. Rogers, Biological and Agricultural Engineering; Ph.D., Oklahoma St. University.

Eugene R. Russell, Civil Engineering, Ph.D., Purdue University.

Andrew Rys, Electrical and Computer Engineering, Ph.D., Texas Tech University.

Malgorzata J. Rys, Industrial and Manufacturing Systems Engineering, Ph.D., Kansas State University.

John R. Schlup, Chemical Engineering, Ph.D., California Institute of Technology.

David A. Schmidt, Computing and Information Sciences, Ph.D., Kansas State University.

Mark D. Schrock, Biological and Agricultural Engineering, Ph.D., Kansas St. University.

J. Kenneth Shultis, Nuclear Engineering, Ph.D., University of Michigan.

Gale G. Simons, Nuclear Engineering, and Electrical and Computer Engineering, Ph.D., Kansas State University.

Gurdip Singh, Computing and Information Scienees, Ph.D., State University of New York, Stonybrook.

John W. Slocombe, Biological and Agricultural Engineering, Ph.D., Iowa State University.

Robert R. Snell, Civil Engineering, Ph.D., Purdue University.

David L. Soldan, Head and Electrical and Computer Engineering, Ph.D., Kansas State University.

Charles K. Spillman, Biological and Agricultural Engineering; Ph.D., Purdue University.

Steven K. Starrett, (Adjunct), Civil Engineering, and Electrical and Computer Engineering, Ph.D., Iowa State University.

James L. Steele, (Adjunct), Biological and Agricultural Engineering, Ph.D., Iowa State University.

James M. Steichen, Biological and Agricultural Engineering; Ph.D., Oklahoma State University.

David R. Steward, Civil Engineering, Ph.D., University of Minnesota.

Robert W. Stokes, Civil Engineering, Ph.D., Texas A&M University.

Allen Stoughton, Computing and Information Sciences, Ph.D., University. of Edinburgh.

Stuart E. Swartz, Head and Civil Engineering, Ph.D., Illinois Institute of Technology.

Daniel V. Swenson, Mechanical Enginecring, Ph.D., Cornell University.

Randal K. Taylor, Biological and Agricultural Engineering, Ph.D., University of Nebraska.

J. Garth Thompson, Head and Mechanical Engineering, Ph.D., Purdue University.

Tim Tredway, Architectural Engineering, MS, University of Kansas.

Elizabeth A. Unger, Computing and Information Sciences, Ph.D., University of Kansas.

Larry E. Wagner, (Adjunct) Biological and Agricultural Engineering, Ph.D., Kansas State University.

Waltcr P. Walawender Jr., Chemical Engineering, Ph.D., Syracuse University.

Hugh S. Walker, Mechanical Engineering; Ph.D., Kansas State University.

Virgil E. Wallentine, Head and Computing and Information Sciences, Ph.D., Iowa State University.

Youqi Wang, Mechanical Engineering, Ph.D., Shanghai Jiao Tong University.

Warren N. White, Jr., Mechanical Engineering, Ph.D., Tulane University.

Chih-Hang (John) Wu, Industrial and Manufacturing Systems Engineering, Ph.D., Pennsylvania State University.

Xiao Jiang Xin, Mechanical Engineering, Ph.D., University of Sheffield, United Kingdom.

Naiqian Zhang, Biological and Agricultural Engineering, Ph.D., Virginia Polytechnic Institute and State University.

Maria Zamfir-Bleyberg, Computing and Information Sciences, Ph.D., University of California, Los Angeles.

See individual engineering programs for application information.

English

Head
Lawrence Rodgers

Director of graduate studies
Gregory Eiselein

Graduate faculty
Linda Brigham, Ph.D., University of Maryland.

Timothy Dayton, Ph.D. , Duke University.

Jill R. Deans, Ph.D., University of Massachusetts, Amherst.

Thomas A. Deans, Ph.D., University of Massachusetts.

Jerome Dees, Ph.D., University of Illinois.

Elizabeth Dodd, M.F.A., Ph.D., Indiana University.

M. L. Donnelly, Ph.D., Harvard University.

Gregory Eiselein, Ph.D., University of Iowa.

Carol Franko, Ph.D., University of Wisconsin.
Dean Hall, Ph.D., Kent State University.
Christina Hauck, Ph.D., University of California, Berkeley
Donald Hedrick, Ph.D., Cornell University.
Steve Heller, M.F.A., Bowling Green State University.
Jonathan Holden, Ph.D., University of Colorado.
Angela Hubler, Ph.D, Duke University.
Michele Janette, Ph.D., Yale University.
George Keiser, Ph.D., Lehigh University.
S. Lillian Kremer, Ph.D., Kansas State University.
James Machor, Ph.D., University of Illinois.
Thomas Murray, Ph.D., Indiana University.
Bonnie Nelson, Ph.D., Pennsylvania State University.
Anne Phillips, Ph.D., University of Connecticut.
Donna L. Potts, Ph.D., University of Missouri at Columbia.
Lawrence Rodgers, Ph.D., University of Wisconsin.
David Smit, Ph.D., University of Iowa.
Irene Ward, Ph.D., University of South Florida.
Leland Warren, Ph.D., University of Illinois.
Alison Wheatley, Ph.D., University of Virginia.
Naomi Wood, Ph.D., Duke University.

M.A. program

The M.A. degree in English is awarded in one of four tracks, each of which can be completed in 30 to 33 hours. All tracks include a literature core (9 hours); courses in the chosen track (9 hours); electives (9 hours); a seminar (3 hours); foreign language certification (or equivalent research tool); a final writing project; and a final oral examination, a defense, and discussion of the writing project.

British and American literature

Concentration in this track is on the study of British and American literature; a student may emphasize any time period in either national literature and will work with graduate faculty who are experts in that period.

Creative writing and literature

Concentration in this track is on the student's creative work in fiction, poetry, or drama; the student will work closely with graduate faculty well-published in the genre the student chooses to emphasize. The department's visiting writers program brings several writers of national stature to campus each year. In addition, opportunities for editorial experience are open to graduate students in this track.

Language, composition/rhetoric, and literature

Concentration in this track is on language, composition, and rhetorical theory. Like the other M.A. tracks, this one can prepare students for going on to Ph.D. work and provide professional training as preparation for teaching in community and junior colleges.

Cultural studies and literature

Concentration in this track is on training in Marxist, feminist, poststructuralist, and psychoanalytic theory; a student may complement the study of literature with the study of politics, sociology, political economy, popular and mass culture, film, and other art forms.

Admission procedures

All applications are reviewed by the director of graduate studies and the graduate advisory committee within the department. Applicants are expected to have performed at a B level or better in all of their undergraduate work, but the committee bases its judgment primarily on the student's performance in English courses.

Because some persons do not mature as students until late in their undergraduate careers, the department may sometimes accept students with less than the expected grade average if the students' final semesters indicate the ability to do graduate work. Moreover, the department recognizes that students who have majored in fields other than English as undergraduates may choose English for their graduate work. Such students are usually admitted with provisional standing and are enrolled in courses for undergraduate credit until any deficiencies are made up.

Applications need to include the following:

1. Two completed copies of the standard application form.
2. Two copies of the official transcript from each college or university the applicant has attended. Only official copies are accepted by the Graduate School. (If the transcripts do not show an undergraduate major comparable to that of K-State with a minimum of 24 credit hours in English above the freshman level, the applicant may be admitted with provisional standing and enrolled in courses for undergraduate credit until the deficiency has been removed.)
3. Three letters of recommendation from persons qualified to speak informatively of the applicant's academic performance and his or her potential for advanced study in English.
4. A statement of objectives (a succinct account of aims and interests).
5. A copy of the applicant's GRE scores (general section only).
6. a. A writing sample of 10-15 pages of expository, argumentative, or persuasive prose from applicants who do not have an English major or whose GPA in English falls below 3.0.
   b. A writing sample of either 10–30 pages of fiction or 6-10 poems from applicants who expect to enter the creative writing track.
7. For international students, official reports of their TOEFL scores (for students overseas) or GRE scores, general and advanced-literature sections (for those already studying in the United States). An application fee of $25 is required of all international students.

Financial support

Most M.A. students qualify to be graduate teaching assistants and are provided valuable teaching experience as well as financial support. GTAs receive a nine-month stipend and a full tuition waiver (not including insurance). The Department of English also offers a small number of scholarships; awarded on a competitive basis, these may be held in addition to an assistantship. Students in the creative writing track may apply for the Seaton Fellowships; students in all tracks may apply for the Grindell and Popkins Scholarships.

English courses

Undergraduate and graduate credit in minor field

ENGL 502. Writing Literary Non-Fiction. (3) I, II, S. An introduction to the genres of literary non-fiction and practice in writing those forms. Pr.: ENGL 125 or 200.

ENGL 516. Written Communication for the Sciences. (3) I, II, S. Theory and intensive writing practice for students in the basic and applied sciences. Pr.: Junior standing and ENGL 125 or 200. Will not substitute for ENGL 415.

ENGL 545. Literature for Adolescents. (3) I, II, S. Selecting, reading, and evaluating books for adolescents. For those seeking junior and senior high school certification, English majors, and other students interested in narratives of development and their cultural contexts. Pr.: ENGL 125 or 200.

ENGL 562. Playwriting. (3) I, II, S. Theoretical study and practical application of techniques of playwriting with regard to plot, characters, and production; emphasis on the one-act form. Same as THTRE 562.

ENGL 580. Selected World Literature. (3) I, II, S. This course primarily addresses writing by authors whose native origins lie elsewhere than in Europe or the United States. The content of the course varies from instructor to instructor. The course may examine literature from several countries and regions, concentrate upon literature for one country or region, or focus on a topic which transcends national or regional boundaries. Works studied will have been written in English or translated into English. Pr.: ENGL 120 or 125.

ENGL 599. Special Research in English. (Var.) I, II, S. Individual investigation in authors, genres, periods of literature, or language. Background of preparation needed for investigation undertaken. Undergraduate and graduate credit

ENGL 604. Expository Writing Workshop. (3) I, II, S. Course emphasizes stylistic analysis of modern non-fiction prose in the sciences, social sciences, and humanities. Extensive writing required. Pr.: Junior standing.

Readings courses

ENGL 605–660: The following readings courses are designed primarily for advanced undergraduates although graduate students may also enroll in them. These courses constitute a sequence of period studies covering the chronological range of English and American literature. Within these historical periods, the specific course contents will vary by semester and instructor. They may emphasize literary figures and movements, historical and cultural contexts, or different genres and forms within the periods. Each semester's offerings will be specifically described before each enrollment period in university and department publications. The courses require junior standing and are repeatable with change of subject matter.

ENGL 605. Readings in Medieval Literature. (3) I, II, S.

ENGL 610. Readings in Renaissance Literature. (3) I, II, S.

ENGL 620. Readings in Seventeenth-Century British Literature. (3) I, II, S.

ENGL 625. Readings in Eighteenth-Century British Literature. (3) I, II, S.

ENGL 630. Readings in Nineteenth-Century British Literature. (3) I, II, S.

ENGL 635. Readings in Twentieth-Century British Literature. (3) I, II, S.

ENGL 640. Readings in Early American Literature. (3) I, II, S.

ENGL 645. Readings in Nineteenth-Century American Literature. (3) I, II, S.

ENGL 650. Readings in Twentieth-Century American Literature. (3) I, II, S.

ENGL 655. Readings in American Ethnic-Minorities Literature. (3) I, II, S.

ENGL 660. Readings in Major Authors. (3) I, II, S.

ENGL 661. Advanced Creative Writing: Prose Fiction. (3) I, II, S. Advanced writing of prose fiction. Repeatable once. Pr.: ENGL 461 or instructor permission.

ENGL 663. Advanced Creative Writing: Poetry. (3) I, II, S. Advanced writing or poetry. Repeatable once. Pr.: ENGL 463 or instructor permission.

Topics courses

ENGL 670–695: The following topics courses are designed primarily for advanced undergraduates although graduate students may enroll in them. These courses address topics not confined to a single period in a national literature. Specific course content will vary by semester and instructor. It may emphasize cross-national subjects, literary criticism, the development of a theme or genre over time, new perspectives from social, intellectual, or cultural studies, or non-traditional texts and topics. Each semester's offerings will be described more specifically in university and department publications before each enrollment period. The courses require junior standing and are repeatable with change of subject matter.

ENGL 670. Topics in British Literature. (3) I, II, S.

ENGL 680. Topics in American Literature. (3) I, II, S.

ENGL 690. Topics in Literature for the Young. (3) I, II, S.

ENGL 695. Topics in Literature. (3) I, II, S.

ENGL 700. Old English. (3) I, II, S. The elements of Old English grammar, with readings in prose and poetry. Pr.: Instructor permission.

ENGL 705. Theory and Practice of Cultural Studies. (3) I, II, S. An overview of selected approaches to the study of culture and of their current application in English studies, including psychoanalytic, feminist, Marxist, and poststructuralist approaches. Pr.: Junior standing.

Studies courses

ENGL 710–759: The following studies courses are designed primarily for graduate students, although advanced undergraduate students may also enroll in them. Their specific contents will vary by semester and instructor, but the courses will reflect concerns with literary and rhetorical forms and genres; with specific authors, periods, or literary movements; with perspectives from social, intellectual, and cultural studies; with literary themes; or with language or linguistics. Each semester's offerings will be described more specifically in university and department publications before each enrollment period. The courses require junior standing and are repeatable with change of subject matter.

ENGL 710. Studies in a Literary Genre. (3) I, II, S.

ENGL 720. Studies in a Major Author. (3) I, II, S.

ENGL 730. Studies in a Literary Period. (3) I, II, S.

ENGL 740. Studies in Literary Theory. (3) I, II, S.

ENGL 755. Studies in Composition and Rhetoric. (3) I, II, S.

ENGL 757. Studies in Language and Linguistics. (3) I, II, S.

ENGL 759. Studies in Technical Communications. (3) I, II, S.

ENGL 761. Creative Writing Workshop: Short Fiction. (3) I, II, S. Advanced writing of short prose fiction. Repeatable twice for credit. Pr.: ENGL 661 or Instructor permission.

ENGL 762. Advanced Playwriting. (3) I, II, S. Same as THTRE 762.

ENGL 763. Creative Writing Workshop: Poetry. (3) I, II, S. Advanced writing of poetry. Repeatable twice for credit. Pr.: ENGL 663 or Instructor permission.

ENGL 771. Creative Writing Workshop: Novel/Novella. (3) I, II, S. Repeatable twice for credit. Pr.: ENGL 661 or Instructor permission.

ENGL 795. Literary Criticism. (3) I, II, S. Major trends in American and British criticism and theory, with practice in the analysis of individual literary works. Pr.: Senior standing.

ENGL 799. Problems in English. (Var.) I, II, S. Independent study in major authors, genres, and periods of English and American literature and language. Pr.: Background of courses needed for problem undertaken.

Graduate credit

ENGL 801. Graduate Studies in English. (1) I, II, S. A survey of the methods and aims of advanced level research and scholarship in language and literature. Required in the first year of study toward the M.A. in English as an orientation to the profession.

ENGL 805. Practicum in Teaching University Expository Writing. (1–3) I, II. Required of GTAs teaching Expository Writing in the English Department. Instruction in the theory and practice of teaching in a university expository writing program. Cannot count in the student's program of study. Pr.: graduate status and a GTAship in the English Department. May be repeated once with different content. Cr/No Cr.

ENGL 820. Seminar in Language. (3) I, II, S. Intensive research concerned with one or more topics in the structure and history of the English language. Pr.: ENGL 600 or 790 or Instructor permission.

ENGL 825. Seminar in Literature. (3) I, II, S. Intensive research concerned with one or more literary genres, periods, authors, or issues/problems. Pr.: Graduate standing.

ENGL 830. Seminar in Cultural Studies. (3) I, II, S. Intensive research concerned with one or more topics central to the theory and practice of Cultural Studies. Pr.: Graduate standing.

ENGL 840. Seminar in Composition and Rhetoric. (3) I, II, S. Intensive research on materials germane to the history, structure, and processes central to the concerns of Composition and Rhetoric. Pr.: Graduate standing.

ENGL 890. History of the English Language. (3) I, II, S. The development of British and American English from Indo-European origins to the present. Pr.: Graduate standing or Instructor permission.

ENGL 897. Colloquium in English. (3) I. Discussion of selected literary topics related to the M.A. examination in English. Pr.: Second-year standing in the M.A. program.

ENGL 899. Research in English. (Var.) I, II, S. Pr.: Permission, Director of Graduate Studies.

ENGL 999. Research in English. (Var.) I, II, S. Pr.: Sufficient training to carry on the research undertaken for dissertation. Pr.: Permission, Director of Graduate Studies.

Linquistics courses

Undergraduate and graduate credit

LING 594. Comanche Texts. (3) I, in alternate years. General introduction to Comanche grammatical and discourse systems and study of oral narratives: published and unpublished texts including coyote stories, adventure stories, personal recollections, etc. Some attention to pronunciation, but major emphasis on the development of a basic reading ability and understanding of the world portrayed in the narratives. Same as LG 594.

LING 595. Archeological Decipherment. (3) I, in alternate years. The art and science of four famous cases of decipherment Mesopotamian cuneiform Egyptian hieroglyphics, Creto-Mycenaean Linear B, and on-going work on the Maya script. Characteristics of successful decipherments and resultant increases in knowledge about the history of writing and the richness of various cultures of the past. Same as LG 595.

LING 600. Principles of Linguistics. (3) The scientific study of language, with examples from English, Spanish, French, German, and others. Overview of language origins, phonetics, phonology, syntax, semantics, language acquisitions, dialects, language change, and writing systems. Same as ENGL 600 and LG 600.

LING 601. General Phonetics. (3) I, in alternate years. Description and classification of speech sounds according to point and manner of articulation. Transcription in the International Phonetic Association Alphabet. Includes sounds of English, French, Spanish, German, and others. Same as ENGL 601 and LG 601.

LING 602. Historical Linguistics. (3) I, in alternate years. Internal and comparative reconstruction of earlier forms of languages. Genetic relationships in language families, and various typological considerations. Includes French, Spanish, and others. Same as ENGL 602 and LG 602.

LING 603. Topics in Linguistics. (1–3) I, in alternate years. Seminar on a special-topic in linguistics: decipherment of ancient writing systems, linguistics applied to the teaching of English or other languages, discourse analysis (especially of spoken texts), etc. Topic to be announced for semester in which offered. Repeatable for credit on a different topic. Same as ENGL 603 and LG 603.

LING 783. Phonology I. (3) Basic concepts of the theory of language sound systems with particular reference to English but including reference to other languages as well. Pr.: SPCH or ENGL 681 and SPCH, ENGL, or MLANG 780. Same as ENGL 783 and LG 783.

LING 785. Syntax I. (3) Basic concepts of syntactic theory, with particular reference to English but including reference to the grammatical systems of other languages as well. Pr.: ENGL 530 or SPCH, ENGL, or LG 780. Same as ENGL 785 and LG 785.

LING 792. Field Methods in Linguistics. (3) On sufficient demand. Techniques of collecting and analyzing linguistic data in the field. Work with language consultants in class, on languages such as Swahili. Pr.: Consent of the instructor. Same as LG 792 and ANTH 792.

LING 796. Theories of Grammar. (3) I. Comparative examination of the assumptions, aims, and procedures of four types of English grammar—the normative grammar of Robert Lowth, the historical grammar of Otto Jespersen, the structural grammar of Leonard Bloomfield, and the generative-transformation grammar of Noam Chomsky—and their application. Same as ENGL 796. Pr.: Junior standing, and ENGL 530 or LING 600.

For more information

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Entomology

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Director of graduate studies
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Kun Yan Zhu, Ph.D., Utah State University

Programs

The Department of Entomology has an internationally recognized graduate program, leading to the M.S. or Ph.D. degree. A wide variety of opportunities for graduate study are offered in several areas of research in which the faculty have established expertise. These areas include arthropod pest management, insect behavior, biochemistry, insect biological control, ecology, genetics, morphology, physiology, plant resistance to insects, stored-product insects, molecular systematics, insect toxicology, and veterinary entomology.

Various faculty have received national awards for excellence in research, teaching and extension. Others have served as presidents of the Central States Entomological Society and the Kansas State University chapter of the Society of Sigma Xi. Graduate student academic teams have competed actively in the annual Linnean Games, sponsored by the Entomological Society of America, winning the national championship in 1983 and 1989 and finishing second in 1985, 1993, and 1994. Faculty receive competitive research grant awards from the National Science Foundation, and the National Research Initiative Grants Program of the U.S. Department of Agriculture.

The goal of the department is to provide students with opportunities for basic and practical experience in research, teaching and extension. Faculty encourage students to participate in the preparation of extramural-funded grant proposals. Faculty and students publish in many of the leading scientific journals in the world. The department encourages presentation of student research at professional meetings by offering student travel and research awards. In addition to a seminar series that brings nationally and internationally recognized scientists to the department, faculty and students participate together in journal discussion groups on a variety of entomological topics.

Facilities

The Department of Entomology is housed in Waters Hall. Well-equipped laboratories are available for all described programs. The department maintains a student computer laboratory, a scanning electron microscope laboratory, and a research insect collection. All offices and laboratories contain personal computers that are networked to local and global services. Kansas State University also offers access to Internet 2. Classrooms and teaching laboratories have been renovated and utilize multimedia in instruction. Facilities include new greenhouses, bioclimatic chambers, and rearing rooms. Field research is conducted on experimental farms at Manhattan and at branch experiment stations throughout the state. Cooperative research programs exist with the departments of animal sciences; agronomy; biochemistry; grain science and industry; plant pathology; horticulture, forestry, and recreational resources; Wheat Genetics Resource Center; the College of Veterinary Medicine; the U.S. Grain Marketing and Production Research Center, and other U.S. and international organizations.

Degrees

Admission

All applicants for graduate study are expected to have a background in biology, chemistry, mathematics and the physical sciences. An overall 3.0 GPA (B average) is expected and results of the Graduate Record Examination are encouraged but not required. International students must present evidence of proficiency in English (TOEFL or other acceptable examination). Applicants submit transcripts of all previous academic training, a letter describing career objectives and have three letters of recommendation (forms avaliable on our website) sent. Acceptance into the department is based upon approval by the graduate affairs committee, the department head, an advisor with whom the graduate program will be developed, and admission by the Graduate School.

Performance standards and evaluation

Students and their major advisor are responsible for the selection of a supervisory committee, which must approve a program of study by the end of the second semester for M.S. students or third semester for Ph.D. students. The plan should consist of a curriculum vitae, a proposed course of study and a thesis or dissertation research proposal. The program of study for all Ph.D. students should prepare them to demonstrate proficiency in at least five of the following areas: internal and external morphology; systematics and evolution; physiology; behavior; genetics; ecology; and principles of pest management (to include no more than two of: integrated pest management; biological control; toxicology; host resistance and at least one area of specialization outside the department (i.e., statistics, biochemistry, plant or animal physiology). Proficiency is demonstrated through satisfactory completion of written and oral preliminary exams. Teaching and/or extension training opportunities may be added to these minimum requirements by the student's supervisory committee. All Ph.D. students are encouraged to enroll in Insect Morphology, Insect Taxonomy, Taxonomy of Immature Insects, Insect Ecology, and Anatomy and Physiology of Insects, unless these courses have been taken previously at other institutions.

The final oral examination at the master's level will be both comprehensive and a defense of the candidate's thesis or report. In case of failure, a second examination may be scheduled in accordance with university regulations. Ph.D. students take both written and oral preliminary examinations no later than the semester following completion of the second year of the student's program. Both examinations must be complete no later than

seven months before the final Ph.D. examination. Oral examinations come after written examinations and may be taken only if written examinations are passed. A student may not proceed to the oral portion of the examination if he/she has failed on the written portion. Such an instance constitutes one attempt. No more than one additional attempt may be permitted without approval of the Graduate Council. The circumstances under which a second attempt involves the entire written portion or merely a repetition of failed sections is governed by the policy within the program. The final oral examination for the Ph.D. degree will be a defense of the candidate's dissertation.

Financial assistance

Stipends

The Department of Entomology supports graduate study and development in numerous ways. Stipends are available as graduate research, teaching, curatorial and extension assistantships. Department faculty successfully secure research grants from federal agencies, commodity commissions, agribusiness corporations, and private foundations, which fund many graduate students on research assistantships. The department also supports two teaching assistantships, one extension assistantship and several research assistantships. The level of financial support is essentially the same for students regardless of the source. Check with the department for current rates. The stipends normally increase each year. Student fees are assessed at in-state rates for all graduate assistants.

Students are encouraged to seek teaching experience. A student can obtain teaching experience as a paid, non-credit hour teaching assistant or a graduate teaching assistant receiving variable credit for ENTOM 932 Topics in General and Systematic Entomology.

Performance requirements for continuation

In order to maintain financial assistance from assistantships or fellowships for teaching or research, graduate students are expected to maintain a B average in all course work. Failure to maintain that average will result in academic probation for one semester before reinstatement as a regular graduate student.

Entomology courses

Graduate credit

ENTOM 250. Insects and People. (3) I, every year. An undergraduate non-majors course intended for the University General Education curriculum on the global impact of insects on human concerns, such as the role of insects as disease vectors, agricultural pests, and pollinators. Two hours lecture and one one-hour interactive session per week. Pr.: none.

ENTOM 612. Insect Pest Diagnosis. (2) I, in odd years. Diagnosis of plant damage by insects and mites, recognition of harmful insects and mites and beneficial insects. Emphasis on field crop pests but pests of other crops will be considered if there is sufficient interest. One hour lecture and two hours lab a week. Pr.: ENTOM 314 or 710.

ENTOM 620. Insecticides: Properties and Laws. (2) II. Offered even years. Introduction to insecticides as arthropod control agents, including their classification, formulation, properties, mode of action, metabolism, resistance, benefits and environmental impact, and federal and state laws that regulate the development, sale, use and storage of insecticides. Two hours of lecture a week. Pr.: CHM 110.

ENTOM 680. Aquatic Entomology. (3) I, odd years. Biology and ecology of aquatic insect orders and families, their roles in aquatic ecosystems, relationships to people, and use as sensitive biomonitoring agents to detect ecological disturbances. Labs teach sampling techniques and use of keys to identify aquatic insects to family and selected genera. Two hours lec. and one two-hour lab a week. Pr.: ENTOM 312 and 313; or BIOL 201.

ENTOM 692. Insect Ecology. (2) II, in even years. Abiotic and biotic factors underlying the distribution and abundance of insects and how to measure them. How these factors affect insect population processes, life history adaptations, and community structure especially in agricultural systems. Emphasis on basic concepts, experiments, and methods. One hour lecture and two hours lab a week. Pr.: BIOL 430 or BIOL 312 or equiv.

ENTOM 706. External Insect Morphology. (3) I, in even years or on sufficient demand. External form and structure of insects with emphasis on the functional aspects of present structure. Theories of the evolution of structure from the ancestral to the derived state including, where possible, successive evolutionary stages. Differences between leading theories are discussed. Designed for beginning graduate students and advanced undergraduates. One hour lecture and six hours lab a week. Pr.: ENTOM 300 or 312 and 313.

ENTOM 710. Insect Taxonomy. (3) II, in odd years. Laboratory study of insect Order and family-group identification. Proper preparation and maintenance of adult insect collections. Lecture stresses the principles of systematics, legal principles of nomenclature, and the phylogeny of insects and their near relatives. For beginning graduate and advanced undergraduate students. One hour lecture and six hours lab a week. Pr.: ENTOM 300 or 312 and 313; ENTOM 706 recommended but not required; insect collection desirable.

ENTOM 767. Insect Pest Management. (3) I, in even years. A presentation of the items necessary to consider in order to develop a sound pest management program, from identification of a problem to recommendations made to growers for dealing with a pest. Two hours lecture and one lab a week. Pr.: ENTOM 300 or ENTOM 312.

ENTOM 799. Problems in Entomology. (Var.) I, II, S. For nonthesis or nondissertation studies. Work in various fields of entomology. Pr.: Consent of instructor.

ENTOM 805. Insects of Stored Products. (3) II, in even years. Biology, ecology, and behavior of stored-product insects and current practices involved in their control. Two hours lecture and three hours lab a week. Pr.: ENTOM 300, or 312 and 313, or consent of instructor.

ENTOM 815. Experience in Extension Entomology. (1–3) II. Major emphasis is to give students a realistic view of the history, structure, philosophy, and position responsibilities assumed by entomology state and area specialists within the Cooperative Extension Service through hands-on experience. Pr.: ENTOM 612 or 767.

ENTOM 820. Biological Control. (3) II. Offered odd years. The theory and practice of biological control with an emphasis on natural enemies of insect pests. Relationship and importance of insect ecology and integrated pest management to biological control. Experimental approaches, evaluation, recognition and life histories of beneficial species will be covered. Two hours of lecture and two hours of lab a week. Pr.: ENTOM 300 or 312 or 320 and ENTOM 692 or BIOL 529.

ENTOM 845. Insect Control by Host Plant Resistance. (3) I, in even years. Resistance of varieties of crop plants to insect attack and utilization in insect control; insect habits and physiology in relation to the cause of resistance and methods of breeding resistant varieties of crops. Pr.: ENTOM 300 or 312 and 313 and a course in either plant or animal genetics.

ENTOM 857. Toxicology of Insecticides. (3) II. Offered odd years. Advanced study of synthetic and naturally occurring insecticides with emphasis on distribution and elimination, metabolism, mechanism of action, resistance mechanisms, and current advances in new insecticide discovery and new approaches to insect control. The lab focuses on providing hands-on experience with techniques frequently used by toxicologists. Two hours of lecture and one 3-hour lab each week. Pr.: CHM 350, or BIOCH 521, or ENTOM 620.

ENTOM 865. Internal Insect Morphology. (3) II, in odd years. Internal anatomy of representative insects; plan and structure of internal systems. One hour lecture and six hours lab a week. Pr.: ENTOM 706.

ENTOM 875. Insect Physiology. (3) I, in odd years. Functions of insect systems for development, metamorphosis, and reproduction. Physiological and biochemical mechanisms underlying insect activities, behavior, and ecological adaptations. Two hours lecture and three hours lab a week. Pr.: ENTOM 865 or consent of instructor.

ENTOM 893. Controversies in Insect Ecology. (3) I, in even years. Alternative and conflicting approaches to, interpretations, and applications of principles of insect ecology. Examination of history, assumptions, and experiments behind these controversies. Special attention to impact of these conflicts on insect pest management. Three hours lec./discussion per week. Pr.: BIOL 529 or BIOL 631 or ENTOM 692 or other ecology course.

ENTOM 898. Master's Report in Entomology. (Var.) I, II, S. Work in various fields of entomology. Pr.: Consent of instructor.

ENTOM 899. Master's Research in Entomology. (Var.) I, II, S. For student majoring in entomology. Pr.: Knowledge in special area and consent of instructor.

ENTOM 910. Insect Genetics. (3) I, in odd years. The course will initially describe the variety of genetic systems found in insects. Laboratory and statistical techniques will be discussed for studying genetic variation in insect populations. The final part of the course will focus on means for genetic manipulation of populations. The laboratory session will be used to discuss and/or demonstrate techniques for studying insect genetics. 2 hours lecture and one 3-hour lab each week. Pr.: BIOL 430 or ASI 500, ENTOM 710 and ENTOM 875.

ENTOM 920. Insect Behavior. (3) II, in even years. The study of the mechanisms, ecology, and evolution of behavior in social and nonsocial insects. Pr.: ENTOM 312, 313, and 875. Three hours lecture a week.

ENTOM 930. Topics in Environmental and Physiological Entomology. (Var.) II. Selected topics for advanced study in insect behavior, biomechanics ecology, genetics, physiology, and related areas. Pr.: Consent of instructor.

ENTOM 932. Topics in General and Systematic Entomology. (Var.) I, II. Offered on demand. Principles of taxonomy; advanced taxonomy; taxonomy of immature insects; acarology; biological literature; and teaching experience. Pr.: ENTOM 710 and consent of instructor.

ENTOM 995. Entomology Seminar. (1) I, II. Pr.: Consult seminar committee. Pass/fail grade only.

ENTOM 999. Research in Entomology. (Var.) I, II, S. Dissertation credit for students majoring in entomology. Pr.: Knowledge in special area and consent of instructor.

For more information

For additional information and application materials please contact:

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Family Studies and Human Services

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Walter R. Schumm, Ph.D., Purdue University.
Ann Bosma Smit, Ph.D., University of Maryland.
Farrell J. Webb, Ph.D., University of Minnesota.

Overview

The School of Family Studies and Human Services is a multidisciplinary program that provides graduate training for M.S. and Ph.D. students. The professional specializations are addressed to broad issues concerning individuals and families, and the courses are taught by a faculty of sociologists and psychologists, educators and economists, health specialists and gerontologists, social workers, marriage and family therapists, speech language pathologists, and audiologists.

Extensive research and professional practice opportunities are provided through seven centers operated by the program: Early Childhood Laboratory; Computer-Assisted Telephone Interviewing Laboratory; the Family Center, Hoeflin Stone House Child Care Center; Speech and Hearing Center; Marriage and Family Therapy Clinic; and the Galichia Institute for Gerontology and Family Studies.

The school offers graduate work toward M.S. and Ph.D. degrees in a broad range of the human sciences and human services. The M.S. degree in family studies and human services includes specializations in adolescence and youth, communication sciences and disorders, early childhood education, early childhood special education, family life education and consultation, life span human development, and marriage and family therapy. The school offers the following specializations leading to the Ph.D. degree in human ecology: family life education and consultation, life span human development, and marriage and family therapy.

Graduate program specializations

Adolescence and youth

M.S. students in this program study adolescence from a developmental perspective in a family context. Graduates are prepared to be administrators for group care adolescent facilities, counselors of adolescents, and educators who consult or provide programs for organizations concerned with youth and families.

Communication sciences and disorders

The program in communication sciences and disorders offers the M.S. degree with emphasis in speech-language pathology. It has clinical affiliations with a variety of professional sites including public school systems, hospitals, and specialized settings such as The Capper Foundation for Crippled Children. The speech-language pathology master's degree program is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association (ASHA). Graduates of the program are eligible for clinical certification by ASHA. The program also meets the requirements of the Kansas Department of Education certification guidelines for speech clinicians and for licensure awarded by the Kansas Department of Health and Environment.

Early childhood education

The M.S. program in early childhood education prepares individuals to be curriculum specialists, directors of early childhood programs, and leaders in the development of child care policy. Early childhood education certification is available with additional course work.

Early childhood special education

The M.S. program in early childhood special education leads to a teaching certificate endorsement by the Kansas Department of Education in this area of specialization as well as career opportunities in teaching and administration.

Family life education and consultation

The M.S. and Ph.D. specializations in family life education prepare students to develop and implement educational programs designed to strengthen family life. Course work and practica are tailored to the backgrounds and professional goals of each student, with emphasis on human development and family studies, and on program development and evaluation.

Gerontology

The school participates in the university's interdisciplinary graduate emphasis program in gerontology at both the M.S. and Ph.D. levels. This program prepares graduates to establish careers in academic work, research, program development, or professional services related to aged individuals and their families.

Life span human development

The life span human development M.S. and Ph.D. specializations are concerned with the growth and development of the individual, the varying contexts of human development, and the processes underlying development throughout the life cycle. Emphasis is placed on understanding the continuous and systematic changes in individual behavior.

Marriage and family therapy

The marriage and family therapy M.S. and Ph.D. specializations prepare professionals to conduct and evaluate therapy with marital and family groups. Students pursue programs of study that include course work in human development, family studies, marital and family therapy, statistics, and research methods. Both the M.S. and Ph.D. specializations in marriage and family therapy are accredited by the Commission on Accreditation for Marriage and Family Therapy Education.

Other specializations

See the Human Ecology section of the catalog for further information on the Ph.D. program.

Courses

Undergraduate and graduate credit in minor field

FSHS 505. Families, Employment Benefits and Retirement Planning. (3) I. Study of micro and macro considerations for retirement planning. Survey of various types of retirement plans, ethical considerations in providing retirement planning services, assessing and forecasting financial needs in retirement, and integration of retirement plans with government benefits. Pr.: FSHS 405.

FSHS 506. Middle Childhood and Adolescence. (3) I. Principles of growth and development during middle childhood and adolescence, including familial, societal, and other ecological factors affecting development of youth. Pr.: FSHS 110 or PSYCH 110.

FSHS 507. Middle Childhood Lab. (1) I. Analysis of situations facing children age six to twelve and design of interventions to enable these children to cope with these situations. Prior or concurrent enrollment in FSHS 506.

FSHS 508. Adolescent Lab. (1) I. Analysis of situations facing adolescents and design of interventions to enable adolescents to cope with these situations. Prior or concurrent enrollment in FSHS 506.

FSHS 510. Human Development and Aging. (3) I. Survey of issues, research, and problems in aging and human development throughout adulthood, with particular emphasis upon the later years. Pr.: FSHS 110 or PSYCH 280.

FSHS 520. Augmentative and Alternative Communication. (2) II. This course is concerned with an introduction to augmentative and alternative communication (AAC) to provide the student with an overview of characteristics, evaluation, and management information serving permanently or temporarily nonspeaking individuals. Course emphasis will be on experience with electronic communication devices.

FSHS 524. Professional Seminar in Early Childhood Education. (3) II. Examination of programs for young children, including philosophical and theoretical foundations. Implementation and evaluation of program models and related issues and research. Pr.: FSHS 310 or PSYCH 280.

FSHS 525. Estate Planning for Families. (3) II. Introduction to fundamentals of the estate planning process. Includes property transfer, tax consequences, probate avoidance, powers of appointment, and various tools/techniques used in implementing an effective estate plan. Pr.: FSHS 405.

FSHS 528. Exceptional Development in Early Childhood. (3) II. Exceptional development in early childhood (birth to five years), including sensory impairments, physical impairments, communication disorders, mental retarda-

tion, behavioral problems, and gifted performance; formal and informal assessment in all developmental areas; the family's role in the assessment/referral/intervention process. Pr.: FSHS 310.

FSHS 540. Curriculum for Cognitive and Language Development of Young Children. (3) I. Planning for the enhancement of cognitive and language development. The application of child development theory to the planning of programs for young children within the major curriculum areas. Concurrent with FSHS 545 or 546. Prior or concurrent with FSHS 555. Pr.: FSHS 310 and 313 and admission into teacher education.

FSHS 541. Curriculum for Emotional, Social, and Physical Development of Young Children. (3) II. Planning for the enhancement of physical, social, and emotional development. The application of child development theory to the planning of programs for young children within the major curriculum areas. Concurrent with FSHS 545 or 546. Pr.: FSHS 310 and 313 and admission into teacher education.

FSHS 545. Early Childhood Program Lab I. (1) I, II. Application of principles and techniques to planning, implementing, and evaluating developmentally appropriate activities for young children in a supervised lab setting and in recitation sessions. Concurrent with FSHS 540 or 541. Pr.: FSHS 310 and 313 and admission into teacher education.

FSHS 546. Early Childhood Program Lab II. (2) I, II. Advanced application of principles and techniques for developmentally appropriate programs for young children. Planning, implementing, and evaluating activities in a supervised lab setting. Concurrent with FSHS 540 or 541. Pr.: FSHS 545 and admission into teacher education.

FSHS 550. The Family. (3) I, S. Consideration of the family throughout the family life cycle; developmental tasks at each stage. Use and impact of family support services. Pr.: Nine hours in FSHS or other social science and junior standing.

FSHS 560. Clinical Research in Communication Sciences and Disorders. (3) II. Logic and methods of clinical research with emphasis on those most frequently used in speech-language pathology and audiology. Experience formulating, doing, and evaluating research. Pr.: STAT 330 or equiv.

FSHS 563. Speech Physiology. (4) I. Physiology of the structures involved in speech production. This course includes methods of investigation and recent research in experimental phonetics, as well as developmental anatomy of the head and neck. Pr.: FSHS 350.

FSHS 565. Language Development. (3) I, II. Survey of the development of speech and language skills in children. Pr.: FSHS 310.

FSHS 580. Directed Field Experience. (8) I, II. A block field placement in local agencies. Faculty-supervised experience in direct service to clients: individuals, groups, and communities. Weekly seminar during placement emphasizes theory underlying the practice. Pr.: FSHS 301 or SOCWK 260; FSHS 550; and consent of instructor.

FSHS 585. Professional Seminar in Family Life Education. (4) I, II. Consideration of professional philosophy, identity, ethics, career development, and characteristics of client populations. Development of skills for family life educators working in agencies with various socioeconomic, age, and ethnic groups. Pr.: Concurrent enrollment in FSHS 580.

FSHS 589. Administration of Early Childhood Programs. (3) I. Rationale for and techniques of administering programs for preschool children, including health, education, social services, parent involvement. Pr.: Nine hours in FSHS or other social science and junior standing.

FSHS 590. Proseminar in Human Development and Family Studies. (1–3) On sufficient demand. Review of specific issues or professional practices affecting children and/or families. Pr.: Junior standing and consent of instructor.

FSHS 591. Undergraduate Topics in Communication Sciences and Disorders. (1–3) Review of current topics in speech-language pathology and/or audiology. May be repeated for a maximum of 6 hours with a change in topic. Pr.: Consent of instructor.

FSHS 595. Professional Seminar in Family Financial Planning. (3) II. Examination of professional issues in family financial planning, including ethical considerations, regulation and certification requirements, communication skills, and professional responsibility. Development of skills needed for family financial planners working with families in meeting their financial needs. Pr.: Senior standing and FSHS 405.

FSHS 598. Directed Experiences in Early Childhood Education. (8) I, II, S. Participation in a preschool program; planning, instruction, evaluation. Prearrangement and consent of instructor required. Pr.: FSHS 420, 540, 541, 545, 546, and admission into teacher education.

Undergraduate and graduate credit.

FSHS 600. Economic Status of Women. (3) II, in alternate years. Socioeconomic factors affecting the economic roles of women. Income, wealth, discrimination, employment, household production, and attitudes as they pertain to the economic position of women in society. Pr.: Junior standing and ECON 110.

FSHS 603. Coping with Life Crises. (3) I. Examination of the effects of human competencies and coping strategies on successful adaptation to anticipated life crises, developmental transitions, and sudden, unexpected life events. Pr.: FSHS 110 or PSYCH 110 and 6 hours of social science.

FSHS 605. Communication Disorders and Aging. (3) An introduction to the most common communication disorders of older persons. Appropriate service delivery models and special needs of the elderly are discussed. Pr.: Consent of instructor.

FSHS 615. Manual Communication II. (3) Instruction in an additional 400-500 signs in the SEE system. Introduction to elementary ASL techniques. Discussion of other augmentative communication systems. Research will be conducted in the use of various manual communication systems with special populations, including aphasic, language disabled, mentally handicapped, and others. Pr.: FSHS 400 or basic sign language skills.

FSHS 652. Black Families. (2–3) Selected topics for understanding life styles of black families. Implications for professionals working with black children and families. Pr.: Nine hours in FSHS or other social science and junior standing.

FSHS 654. Death and the Family. (2–3) I. Exploration of contemporary attitudes toward death and dying; related influences on individual development and family life. Pr.: FSHS 550 or SOC1O 640.

FSHS 670. Working with Parents. (3) II. Approaches to parenting and parent education with emphasis on programming implications of life-span developmental principles within a family context. Pr.: FSHS 350 and 550.

FSHS 675. Field Study in Family Economics. (1–3) I, II. Supervised experiences in financial counseling, community action, or consumer services. Pr.: Consent of instructor.

FSHS 700. Problems in Family Studies and Human Services. (Var.) I, II, S. Independent study on aspects of human development and family studies. Pr.: Consent of instructor.

FSHS 704. Seminar in Family Studies and Human Services. (Var.) I, II, S. Interpretation and evaluation of information on varied topics relating to family members. May be taken for a maximum of nine hours. Pr.: Nine hours of FSHS or other social science.

FSHS 705. Practicum in Speech-Language Pathology. (1–3) I, II, S. Supervised practice in the use of the methods and materials of speech-language pathology. Pr.: FSHS 449 and consent of instructor.

FSHS 706. Practicum in Audiology. (1–3) I, II, S. Supervised practice in the use of equipment, materials, and methods of audiology. Pr.: FSHS 720 or concurrent enrollment and consent of instructor.

FSHS 708. Topics in Family Studies and Human Services. (2–3) I, II, S. Review of recent research and theory related to exploration of methods and family and interpersonal processes. Pr.: Consent of instructor. May be taken more than one semester.

FSHS 709. Public Policy and Family Economic Well-Being. (3) I. Analysis of conceptual models for policy choices. Impact of socioeconomic and public policy factors on family economics well-being, including the special issues faced by financially disadvantaged and nontraditional households. Pr.: Nine hours in FSHS or other social sciences.

FSHS 710. Child Care: Components and Issues. (2–3) On sufficient demand. Resources and facilities of quality child care; exploration of methods and philosophies of such programs; designed for those working with paraprofessional child care personnel. Pr.: Fifteen hours of either social science and/or FSHS.

FSHS 720. Audiology I. (3) II. Fundamental topics in audiology. Included are monitoring of equipment calibration, pure tone measurements, masking, speech testing, and tympanometry. Laboratory practice is required. Pr.: FSHS 351.

FSHS 721. Audiology I Laboratory. (1) II. Effects of noise on hearing. Development, management, and control of community hearing conservation programs. Pr.: FSHS 720 or concurrent enrollment.

FSHS 728. Assessment of Young Children. (3) I. Theory and practice of individual assessment of handicapped and normal children, infancy to age eight, including cognitive, language, fine and gross motor, social, and self-help skills. Focus on selection, administration, interpretation, and evaluation of screening and comprehensive evaluation instruments for assessment and individual program planning. Pr.: FSHS 310.

FSHS 740. Play Facilitation. (3) II. The emphasis of this course is the empirical study and practice of play as an educational, evaluative, and therapeutic intervention with young children. Pr.: FSHS 540

FSHS 741. Fluency Disorders. (3) I. Research and theory concerning etiology, characteristics, assessment, and treatment of individuals with disfluency problems. Pr.: FSHS 560.

FSHS 742. Language Assessment and Intervention II. (3) II. Theory and research concerning language disorders in school-aged children are presented. Specific language assessment and intervention methodologies for this population are reviewed. Dialectal and bilingual considerations for assessment and intervention are addressed. Pr.: FSHS 443.

FSHS 744. Aural Rehabilitation. (3) I. Study of techniques for the habilitation or rehabilitation of speech and language problems of the hearing impaired. Pr.: FSHS 720.

FSHS 750. Voice and Resonance Disorders. (4) II. Research and theory concerning etiology, characteristics, assessment, and management of individuals with laryngeal disorders and orofacial anomalies. Pr.: FSHS 550.

FSHS 770. Economics of Aging. (3) II, in alternate years. Analysis of economic factors associated with aging; implications for individuals, society, and the economy. Pr.: Nine hours of FSHS or other social sciences.

Graduate credit

FSHS 810. Child Development. (3) I, II. Behavioral characteristics and developmental processes in childhood and adolescence. Analysis of developmental trends and issues in terms of research evidence and theoretical expectations. Pr.: FSHS 310; and 3 additional hours in FSHS or child psychology.

FSHS 815. Infant Behavior and Development. (3) II, in alternate years. Study of the infant as a developing individual within the family; examination of the theories and research relevant to development from conception through the second year. Pr.: FSHS 310, 810; and B1OL 198.

FSHS 820. Theories of Human Development. (3) I. Theories of development relating to physical, social, and psychological patterns of individuals' growth and interaction with the family and the community. Pr.: FSHS 310; and three additional hours in FSHS or child psychology.

FSHS 822. Transition to Adulthood. (3) S, in alternate years. Advanced study of theory and research of the transition period from adolescence through youth to adulthood. Pr.: FSHS 506 and 810.

FSHS 824. Parent-Child Interaction: Theory and Research. (3) II. Developmental theories and empirical research concerning the reciprocal interactions between parents and their children focusing on the socialization of the child within the family. Pr.: FSHS 810.

FSHS 830. Advanced Program Development. (2–3) Alternate II. Analysis of the process and application of child development theory to early childhood program planning. Pr.: FSHS 820.

FSHS 840. Neuropathologies of Speech. (3) I. Research and theory concerning nature, etiologies, evaluation, and principles of neuropathologies. Pr.: FSHS 350.

FSHS 841. Acquired Language Disorders. (3) II. Research and theory concerning the nature, etiologies, evaluation, and treatment of aphasia and language disorders associated with right hemisphere damage, dementia, and traumatic brain injury. Pr.: FSHS 840.

FSHS 845. Adult Development and Aging. (3) II. Developmental aging research as related to individual, social, and family functioning throughout adulthood. Pr.: Twelve hours social science.

FSHS 847. Externship in Speech–Language Pathology. (3–12) I, II, S. Clinical practicum in off-campus sites, including supervised experience in evaluation and treatment of children and adults with communication disorders. May be repeated. Pr.: FSHS 705 and consent of the instructor.

FSHS 849. Graduate Topics in Communication Sciences and Disorders. (1–3) Critical review of recent research related to measurement and modification of speech, hearing, or language deficits. May be repeated for a maximum of 9 hours with change in topic. Pr.: FSHS 560, graduate standing, and consent of the instructor.

FSHS 850. Family Studies. (3) II. Survey of family research literature to illustrate various approaches to the study of the family and to understand family changes within the life cycle. Pr.: FSHS 550; and STAT 330 or 702.

FSHS 851. Professional Issues in Speech–Language Pathology. (2) I. Deals with issues related to professional practice in communication disorders. Includes lectures, discussions, presentations, and observations. It is strongly recommended that this course be taken concurrently with FSHS 847. Pr.: FSHS 705 and consent of the instructor.

FSHS 852. Contemporary Family Theories. (3) I. Survey of contemporary family conceptual frameworks and theoretical perspectives, with emphasis on the application of family theory in basic and applied family research. Pr.: FSHS 550; and STAT 330 or 702.

FSHS 853. Family Systems in Cultural Context. (3) I. Examines systems theory as a framework for understanding families and the cultural contexts in which they are embedded. Discusses the privileges, opportunities and oppressions accompanying membership in a group and emphasizes issues pertaining to gender, race, ethnicity, and sexuality. Discusses implications for family life professionals. Pr.: FSHS 550.

FSHS 855. Family Crisis. (3) I. The nature of stress in the family from a theoretical and research base, focusing on the genesis of family crisis and the family's response to stress and crisis. Pr.: FSHS 550.

FSHS 862. Marital Interaction. (3) I. A study of the dynamics of marital interaction with emphasis upon the interpersonal relationships and processes of adjustment. Pr.: FSHS 350 and 550 and consent of instructor.

FSHS 863. Single-Parent and Reconstituted Families. (3) I, II. Survey of research literature regarding single-parent and reconstituted families. Demography, complexity, problems, strengths, and processes of adjustment of family units and their members. Implications for professionals working with these families. Pr.: FSHS 550.

FSHS 864. Clinical Theory and Practice. (3) I. Frameworks and skills for helping individuals within the family context. Study and observation of operations in family clinical programs and family therapy. Pr.: FSHS 301; FSHS 550 and consent of instructor.

FSHS 865. Human Sexuality. (3) II, alternate S. Focus on implications of personal and familial aspects of human sexuality throughout the life cycle. Pr.: FSHS 350 and six hours social science.

FSHS 870. Principles of Marriage and Family Therapy. (3) II, S. Examination of processes in marriage and family therapy; study of interactions within the therapeutic setting; and application of knowledge of the family and of marriage to the helping relationship. Pr.: FSHS 852 and 864 or EDAF 823 and permission of instructor.

FSHS 871. Family Life Education and Consultation. (3) I, II. Theory and procedures for family life education and consultation with professional and volunteer staff in a variety of settings. Pr.: FSHS 550.

FSHS 875. Delivery of Human Services. (3) I, II, alternate S. Cognitive and experiential understanding of professional responsibilities in working effectively with families in an educational outreach or consultative setting. Pr.: FSHS 871.

FSHS 877. Individual and Family Assessment. (3) I. Assessment of individual and family functioning within developmental, ethnic, community and gender-sensitive contexts; including indicators for further evaluation and referral. Pr.: FSHS 870.

FSHS 878. Professional Studies in Family Therapy. (3) I. Analysis of professional issues, techniques, and responsibilities associated with working effectively with families in a family therapy setting. Pr.: FSHS 864 or concurrent enrollment and consent of instructor.

FSHS 880–885. Practica in Family Studies and Human Services. (Var.) I, II, S. Supervised experience in providing help and/or instruction in the several areas of human development and family studies presented in terms of the special interests of the students. Consent of practicum supervisor is required for each. FSHS 880. Practicum in Counseling. Same as PSYCH 860 and EDAF 863. Pr.: FSHS 870 and EDAF 823.

FSHS 881. Practicum in Family and Community Services. Pr.: FSHS 875 and 871.

FSHS 882. Practicum in Study of Student Development.

FSHS 883. Practicum in Early Childhood Education. Pr.: FSHS 540.

FSHS 884. Practicum in Parent Education. Pr.: FSHS 670.

FSHS 885. Practicum in Marriage and Family Therapy. (3) Supervised experience in marriage and family therapy. Designed for master's level students. Pr.: FSHS 870; FSHS 878 and admission to marriage and family therapy program.

FSHS 890. Research Methods in Family Studies and Human Services. (3) I, II. Study and application of family and human developmental methodology for research in graduate programs and professional careers. Pr.: STAT 330 or 702.

FSHS 891. Family Survey Research. (3) II. Principles and techniques for collection, coding, analysis, and interpretation of survey data from several family members. Computer-oriented. Pr.: STAT 330, FSHS 550 and 890.

FSHS 892. Practicum in Human Development Research. (Var.) I, II, S. Observation, modification, and reporting of behavior. Pr.: FSHS 890; course in methods of research; 9 other graduate hours in family studies and human services; consent of instructor.

FSHS 893. Program Evaluation in Human Services. (3) II. Study and application of program evaluation approaches and methodology pertinent to evaluating programs in human service and education settings. Pr.: FSHS 890 or another graduate level social sciences research course.

FSHS 894. Readings in Family Studies and Human Services. (Var.) I, II, S. Implications of research findings in preparation for professional work in counseling, teaching, and research in human development and family studies. Pr.: Twelve hours in social-behavioral science; and consent of instructor. May be taken for a maximum of 9 hours.

FSHS 895. Principles and Techniques of Family Measurement. (3) II. The comparative reliability and validity of current measures of family interaction and analysis of their suitability for use in program evaluation of family life education and family therapy. Pr.: FSHS 850 and a graduate-level research methods course.

FSHS 896. Advanced Family Therapy. (3) II. Analysis of care management issues and literature related to the application of advanced techniques in family therapy. To be taken concurrently with FSHS 885. Pr.: FSHS 870 and consent of instructor.

FSHS 897. Graduate Seminar in Communication Sciences and Disorders. (3) I, II. Advanced course providing critical analysis of recent theory and research in a designated topic area. May be repeated with a change in subject matter. Pr.: FSHS 560 and consent of the instructor.

FSHS 899. M.S. Research in Family Studies and Human Services. (Var.) I, II, S. Individual research problems which may form the basis for the master's thesis or report. Pr.: Consent of major professor.

FSHS 908. Topics in Family Life Education and Consultation. (3) On sufficient demand. Recent research, theory construction, and program development; focusing on selected relevant topics. Designed for doctoral students in family life education and consultation. Pr.: FSHS 871.

FSHS 910. Topics in Marriage and Family Therapy. (1–3) I, II. Examination of recent research, theory, and clinical practice related to marriage and family therapy. Pr.: FSHS 870 and consent of instructor. May be taken up to 9 hours.

FSHS 930. Human Development Seminar. (3) Analysis of the continuous and systematic changes in the development of individuals as they interact with their physical and social environments. Pr.: FSHS 810, 820, and 845. May be taken for a maximum of 12 hours.

FSHS 950. Advanced Family Theory. (3) I, in alternate years. Examination of theoretical approaches to the study of the family unit from the perspective of interpersonal relationships. Emphasis on axiomatic theory construction in contemporary family studies literature. Pr.: FSHS 850, 852, and 890.

FSHS 979. Advanced Family Life Education and Consultation. (3) II, in alternate years. Theory and practices of family life education and consultation, including issues of development of the family life profession and national family policy. Pr.: FSHS 871.

FSHS 981. Advanced Practicum in Family and Community Services. (1–3) Supervised experience in family life education and consultation. Pr.: FSHS 871, 875, 881, and consent of instructor; may be taken for a maximum of 6 hours.

FSHS 984. Supervision of Marriage and Family Therapy. (3) I. Preparation of experienced marriage and family therapists for supervision roles within educational, medical and agency settings. Must be concurrently enrolled in FSHS 986 (Practicum in Supervision). Pr.: FSHS 896 and FSHS 985.

FSHS 985. Ph.D. Practicum in Marriage and Family. (1–3) I, II, S. Supervised experience in family therapy. Consent of instructor is required. Pr.: FSHS 880. May be taken for up to 9 hours.

FSHS 986. Practicum in Supervision of Marriage and Family Therapy. (1–3) I, II, S. Supervised experience in supervision of marital and family therapy. Consent of instructor required. Pr.: FSHS 985. May be taken for up to 9 hours.

FSHS 988. Conjoint and Group Techniques in Family Counseling. (3) II, S. Advanced theory in marriage and family counseling with emphasis on group techniques. Pr.: FSHS 885 and consent of instructor.

FSHS 990. Dissertation Proposal Seminar. (1) I, II. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, 3 hours of research design or methods, and consent of major professor.

FSHS 999. Ph.D. Research in Family Studies and Human Services. (Var.) I, II, S. Pr.: Consent of major professor.

For more information

For additional information and application materials please contact:
Graduate Admissions
School of Family Studies and Human Services
College of Human Ecology
Kansas State University
305 Justin Hall
Manhattan, KS 66506–1403
785-532-1473
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Home page: http://www.ksu.edu/humec/fshs/fshs.htm

Finance

Head
Anand S. Desai

Director of graduate studies
Cynthia S. McCahon, Assistant Dean

Graduate faculty
John Cooney, Ph.D., University of Utah.
Anand Desai, Ph.D., University of Michigan.
Amir Tavakkol, Ph.D., Kansas State University.

Programs

The Department of Finance supports the master of business administration (MBA) and master of accountancy (MACC) degrees.

Finance courses

Undergraduate and graduate credit in minor field

FINAN 531. Commercial Banking. (3) II. An application of financial management concepts to the liquidity management, investment portfolio analysis, capital budgeting, and capital structure decision-making process required by a commercial bank to perform effectively its financial intermediation role within the financial system's institutional, regulatory, and competitive environment. Pr.: FINAN 815.

FINAN 551. Investments. (3) I, II, S. Analysis of debt, equity, and derivative securities from an investor's viewpoint. Topics covered include the mechanics of investing, investment strategies, asset pricing models, and market efficiency. Pr.: FINAN 450 (may be taken concurrently with FINAN 470).

FINAN 552. Real Estate. (3) II. Principles and practices including legal, economic, and social implications from the viewpoint of the real estate practitioner, investor, and society. Pr.: Junior standing.

FINAN 561. Financing Emerging Businesses. (3) II. A study of the business environment, methods of organizing and financing, investment and valuation, and financial planning from the perspectives of owner-managers and venture capital investors. Pr.: FINAN 470 and 551

FINAN 562. Short-Term Financial Management. (3) I. Application of financial concepts to the firm's short-term investment and financing decisions. Topics include cash collection, cash concentration, cash disbursement, banking relationships, receivables and payables management, hedging, risk management, and international short-term finance. Pr.: FINAN 815.

Undergraduate and graduate credit

FINAN 643. International Financial Management. (3) I. An application of financial management concepts to investment, financing, and managerial control decisions undertaken by the multinational firm within its institutional environment of monetary arrangements, financial intermediary organizations, and balance of payments considerations that affect the international flow of capital. Pr.: FINAN 450.

FINAN 653. Securities and Portfolio Analysis. (3) I, II. A theoretical and empirical study of financial management techniques employed by the professional investor to evaluate the underlying risk-return tradeoff on a particular financial asset investment opportunity and the implications of efficient portfolio management techniques for modifying this risk-return tradeoff experience. Pr.: MATH 220 or 205, STAT 351, and FINAN 815.

FINAN 654. Derivative Securities and Markets. (3) II. Structure and operation of markets for futures, swaps, options, synthetic options, and futures on options. Valuation of futures contracts and options. Applications of derivatives to hedging and speculating strategies. Pr.: FINAN 815.

FINAN 660. Corporate Finance. (3) I, II. In-depth study of a firm's long-term financing, capital investment, and working capital decisions. Topics include cash-flow analysis, capital asset valuation, business, financial, and market risk, dividend policy, capital structure theory, and short-term financial management. This course is not available for credit to students taking FINAN 860. Pr.: MATH 205 and FINAN 815.

FINAN 661. Professional Financial Planning. (3) I, II. A study of the principles and practices of professional financial planning using an integrated planning model. Topics include the planning environment, concepts, tax management, asset acquisition and management, credit management, risk management. investments, retirement planning, and estate planning. Contemporary applications, professional opportunities, and legal/ethical standards are emphasized. Pr.: FINAN 450 and FINAN 551.

FINAN 670. Cases in Financial Management. (4) I, II. A case-oriented analysis of current topics in Financial Management, designed as a capstone course in corporate finance. Pr.: FINAN 551 and FINAN 660.

FINAN 671. Cases in Financial Services. (4) I, II. A capstone course in financial services. Uses the case discussion method to provide students the opportunity to apply their knowledge of finance theory to solve problems related to the financial services industry, including insurance, real estate, individual investments, retirement planning, and management. This course emphasizes the development of analytical skills and requires extensive report-writing, teamwork, and oral presentations. Pr.: FINAN 661.

Graduate credit

FINAN 815. Managerial Finance I. (3) II. Introduction to the process of value creation. Development of an understanding of the environment in which firms operate, including a discussion of financial markets and institutions and valuation of financial assets. Provides a working knowledge of the financial system and analytical tools for decision making. Pr.: ACCTG 810.

FINAN 820. Advanced International Financial Management. (3) II. A study of the international dimensions of corporate financial management with an applied orientation. Pr.: FINAN 815.

FINAN 830. Financial Market Theory. (3) I. Development and analysis of conceptual framework for understanding (1) the functions performed by financial markets and their associated institutional arrangements, and (2) the contractual claims in transferring savings among business, household, and government participants in the economic system. Pr.: FINAN 815.

FINAN 860. Managerial Finance II. (3) I. Advanced concepts in managerial decision making. Topics include strategic financial planning, capital structure, distribution policy, options and futures, real options, financial risk management, and mergers and acquisitions. Synthesis of the concepts and tools is achieved through real world business case analyses. Pr.: ACCTG 810, ECON 815, FINAN 815, MANGT 810, MANGT 820, MANGT 830, MKTIB 810, STAT 702 or FINAN 815 and enrollment in the MAcc program.

FINAN 890. Seminar in Finance. (3) On sufficient demand. In-depth study of selected contemporary issues in finance. Pr.: FINAN 815.

FINAN 898. Advanced Problems in Finance. (Var.) I, II, S. Independent study of selected advanced topic(s) in finance. Pr.: Consent of department head.

For more information

For additional information and application materials please contact:
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Home page: http://www.cba.ksu.edu/cba/depart/finance/default.htm

Food Science

Food science is an interdepartmental graduate program with faculty participants from many academic departments.

Director of graduate studies
Ike J. Jeon

Graduate faculty
Fadi M. Aramouni, Ph.D., Louisiana State University.
R. Scott Beyer, Ph.D., University of Georgia.
Elizabeth Ernst Boyle, Ph.D., Colorado State University.
John Brent, Ph.D., Cornell University.
Edgar Chambers, IV, Ph.D., Kansas State University.
Do Sup Chung, Ph.D., Kansas State University.
Michael E. Dikeman, Ph.D., Kansas State University.
Larry E. Erickson, Ph.D., Kansas State University.
L. T. Fan, Ph.D., West Virginia University.
Rolando A. Flores, Ph.D., Kansas State University.
Daniel Y. C. Fung, Ph.D., Iowa State University.
Karen L. B. Gast, Ph.D., University of New Hampshire.
Leniel H. Harbers, Ph.D., Oklahoma State University.
Thomas J. Herald, Ph.D., Michigan State University.
Melvin C. Hunt, Ph.D., University of Missouri.
Ike J. Jeon, Ph.D., University of Minnesota.
Curtis L. Kastner, Ph.D., Oklahoma State University.
Carol Klopfenstein, Ph.D., Kansas State University.
Donald H. Kropf, Ph.D., University of Wisconsin.
Finlay MacRitchie, Ph.D., University of Sydney.
James Marsden, Ph.D., Oklahoma State University.
Judith L. Miller, Ph.D., Texas Women's University.
Harish C. Minocha, Ph.D., Kansas State University.
Richard D. Oberst, Ph.D., University of California–Davis.
B. Moses Okot-Kotber, Ph.D., University of Dijon, France.
Gary M. Paulsen, Ph.D., University of Wisconsin.
Karen P. Penner, Ph.D., Michigan State University.
Randall K Phebus, Ph.D., University of Tennessee.
Gerald R. Reeck, Ph.D., University of Washington.
Karen Schmidt, Ph.D., University of Minnesota.
Paul A. Seib, Ph.D., Purdue University.
Carole S. Setser, Ph.D., Kansas State University.
Carol Shanklin, Ph.D., University of Tennessee.
J. Scott Smith, Ph.D., Pennsylvania State University.
X. Susan Sun, Ph.D., University of Illinois.
Katherine A. Tilley, Ph.D., Kansas State University.
C. E. (Chuck) Walker, Ph.D., North Dakota State University.

The food science graduate program involves the interrelationships among 37 professionals from 11 departments. Faculty from five colleges (agriculture, arts and sciences, engineering, human ecology and veterinary medicine) have participated in the interdisciplinary food science master's and doctoral programs since 1965. Graduate faculty are located in the departments of animal dciences and industry; grain science and industry; foods and nutrition; hotel, restaurant, institution management and dietetics; chemical engineering; horticulture, forestry and recreation resources; biological and agricultural engineering; agronomy; biochemistry; veterinary clinical sciences; and diagnostic medicine/pathobiology.

Graduate students conduct their research in one of the participating departments. The food science faculty are involved in research on the chemical, microbiological, sensory, and nutritional aspects, functional characteristics, and processing of foods. Faculty with expertise in chemical analysis, instrumental analysis, sensory analysis, systems analysis, biochemistry, dietetics, statistics, microbiology, thermodynamics, rheology, biochemical engineering, and food engineering participate in the food science program. Research facilities related to animal products include complete dairy and red-meat processing facilities, well-equipped research laboratories for red meat, poultry and dairy research, food chemistry, and food microbiology research laboratories. Research facilities for cereals include a complete pilot plant for milling grain into flour, complete baking research facilities, equipment for extrusion research, well-equipped laboratories for cereal chemistry, a specialized cereal science library, and other supporting facilities. Flavor and sensory evaluation laboratories and instrumentation for physical, histological, and biochemical analysis of food products are also available. Laboratory facilities for food engineering research include ultrafiltration cells, instrumental fermentors, gas and liquid chromatography, an elemental analyzer, and an environmental chamber with temperature and humidity control. Facilities and instrumentation for food safety studies are available.

Graduate study in food science provides training for a number of varied academic and technical careers. Food processing is a leading industry in the United States so the need for food technologists is growing. Application should be made at the beginning of the previous semester, and preferably earlier to ensure availability of a major professor. Consult with the Graduate School on admission deadlines. An optimal number of about 50 graduate students is usually maintained; therefore, admission is highly competitive. All prospective students must complete a graduate school application and submit a statement of objectives, official transcripts, three letters of recommendation, and GRE scores. Seniors and master's students may submit a current transcript and, if admitted, will receive provisional acceptance pending submission of an official transcript showing completion of a bachelor's degree, or M.S. degree for doctoral applicants. It is imperative that the statement of objectives contain a specific area of study within food science, i.e., food chemistry, food microbiology, cereals, red meat, or sensory analysis, so that the application may be directed to the appropriate faculty. Terms such as food processing and food technology are too general and may result in rejection because of lack of specificity.

Foreign students must submit a TOEFL score of at least 550 (213 on the computer-based) or have received a degree in the last two years from a United States college or university. In addition, a financial form must be completed and signed by a sponsor and a financial institution to show evidence of support for the entire program of study.

All applications will be reviewed by three appropriate members of the food science graduate faculty. A faculty member must be willing to act as a major advisor prior to submission of credentials to the graduate school.

Research and teaching assistantships administered by the individual departments are available on a limited basis. Those receiving assistantships pay in-state fees. Members of the food science program obtain funds from the Agricultural and Engineering Experiment Stations and outside research funds that help sponsor some graduate research assistants. Currently, research stipends are competitive but may vary by department.

General requirements for entering graduate study in food science are: (1) mathematics, including college algebra, calculus, and statistics; (2) biochemistry and organic chemistry; (3) a course in physics; (4) an introductory course in microbiology; and (5) a course in botany, zoology, or biology. The student's supervisory committee will resolve course deficiencies. Certain programs within food science may require additional courses.

When the student's committee believes it necessary, the student will be required to take additional undergraduate courses to prepare more completely for the individual program.

Candidates for degrees are expected to select courses that provide adequate coverage in several food areas, with primary emphasis in one or more areas.

The M.S./Ph.D. program of study shall be expected to include courses in biochemistry, statistics, food microbiology, food chemistry, and food processing/food engineering. No more than 6 credit hours at the 500 level will be accepted. One credit of food science seminar for the M.S. degree and 2 credits of food science seminar for the Ph.D. degree shall be included. There is no foreign language requirement. Course requirements will be evaluated by the student's supervisory committee. The chairman of the food science graduate program must approve members of the student's advisory committee and the program of study.

Below is a partial list of courses that may be selected for the major. See your advisor for details.

Animal sciences and industry

ASI 605	Fresh Meat Operations
ASI 607	Food Microbiology
ASI 608	Dairy Foods Processing and Technology
ASI 610	Processed Meat Operations
ASI 671	Meat Selection and Utilization
ASI 690	Principles of HACCP
ASI 694	Food Plant Management
ASI 695	Quality Assurance of Food Products
ASI 713	Rapid Methods and Automation in Microbiology
ASI 727	Chemical Methods of Food Analysis
ASI 728	Physical Methods of Food Analysis
ASI 777	Meat Technology
ASI 791	Advanced Application of HACCP Principles in the Meat and Poultry Industry
ASI 793	Valid HACCP Plans
ASI 794	HACCP and Food Inspection
ASI 811	Food Fermentation
ASI 815	Advanced Food Chemistry
ASI 902	Topics in Animal Science
ASI 907	Food Dispersions
ASI 915	Food Toxicology
ASI 930	Advanced Meat Science

Biochemistry

BIOCH 521	General Biochemistry
BIOCH 755	Biochemistry I
BIOCH 756	Biochemistry I Laboratory
BIOCH 790	Physical Biochemistry
BIOCH 840	Intermediary Metabolism
BIOCH 910	Lipids
BIOCH 930	Proteins
BIOCH 940	Chemistry of Carbohydrates
BIOCH 950	Enzyme Chemistry

Biological and agricultural engineering

ATM 540	Introduction to Food Engineering
ATM 541	Introduction to Food Engineering Laboratory Exercises
BAE 575	Fundamentals of Agricultural Process Engineering
BAE 625	Thermal Processing Operations in Food Engineering
BAE 635	Food Plant Design
BAE 700	Agricultural Process Engineering

Biology

BIOL 670	Immunology
BIOL 675	Genetics of Microorganisms
BIOL 690	Microbial Physiology and Metabolism
BIOL 730	General Virology
BIOL 805	Advanced Mycology
BIOL 830	Advanced Virology
BIOL 888	Electron Microscopy Techniques

Chemistry

CHM 545	Chemical Separations
CHM 922	Advanced Separations Laboratory
CHM 942	Advanced Analytical Chemistry

Chemical engineering

CHE 530	Transport Phenomena I
CHE 531	Transport Phenomena II
CHE 550	Chemical Reaction Engineering
CHE 626	Bioseparations
CHE 715	Biochemical Engineering
CHE 805	Selected Topics in Biochemical Engineering

Foods and nutrition

FN 550	Nutrient Metabolism
FN 660	Nutrition and Food Behavior
FN 701	Sensory Analysis of Foods
FN 702	Nutrition in Developing Countries
FN 705	Food Product Development
FN 741	Consumer Response Evaluation
FN 780	Problems in Foods and Nutrition

FN 810	Bionutrition
FN 819	Food Systems
FN 821	Practicum in Sensory Analysis
FN 831	Descriptive Sensory Analysis
FN 844	Nutritional Epidemiology
FN 981	Food Science Colloquium

Grain science and industry

GRSC 500	Milling Science I
GRSC 602	Cereal Science
GRSC 625	Flour and Dough Testing
GRSC 635	Baking Science I
GRSC 636	Baking Science I Laboratory
GRSC 651	Food and Feed Product Production
GRSC 661	Qualities of Feed and Food Ingredients
GRSC 710	Fundamentals of Grain Storage
GRSC 720	Extrusion Processing in the Food and Feed Industries
GRSC 730	Milling Science II
GRSC 734	Milling Processing Technology Management
GRSC 737	Baking Science II
GRSC 738	Baking Science II Laboratory
GRSC 805	Nutritional Properties of Cereals and Legumes
GRSC 811	Principles of Food Analysis
GRSC 815	Fundamentals of Processing Grains for Food
GRSC 820	Advanced Extrusion Processing
GRSC 840	Advanced Grain Processing Technology
GRSC 901	Starch Chemistry and Technology
GRSC 915	Advanced Cereal Chemistry

Horticulture, forestry, and recreation resources

HORT 725	Postharvest Technology and Physiology of Horticultural Crops
HORT 800	Horticulture Physiology

Hotel, restaurant, institution management and dietetics

HRIMD 640	Consultation in Hotel, Restaurant Management and Dietetics
HRIMD 705	Computer Implementation in Foodservice and Hospitality Operations
HRIMD 805	Food Production Management
HRIMD 880	Procurement for Foodservice and Hospitality Operations
HRIMD 890	Administration of Foodservice and Hospitality Organizations
HRIMD 895	Cost Controls in Foodservice Systems

Statistics

STAT 703	Statistical Methods for Natural Scientists
STAT 704	Analysis of Variance and Covariance
STAT 705	Regression and Correlation Analyses
STAT 720	Design of Experiments
STAT 730	Multivariate Statistical Methods

For more information

For additional information and application materials please contact:
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E-mail: ijeon@oz.oznet.ksu.edu
Home page: http://www.oznet.ksu.edu/foodscience/welcome.htm

Foods and Nutrition

Director of graduate studies—food science area
Edgar Chambers, IV

Director of graduate studies—nutrition area
Sung Koo

Graduate faculty

Thomas Barstow, (Kinesiology) Ph.D., Adjunct, University of California–Davis.

Richard Baybutt, Ph.D., Penn State.

Edgar Chambers IV, Ph.D., Kansas State University.

Katherine K. Grunewald, Ph.D., R.D., University of Kentucky.

Carol Ann Holcomb, Ph.D., Oregon State University.

Sung I. Koo, Ph.D., Clemson University.

Paula K. Peters, Ph,D, Ohio State University.

Gur S. Ranhotra, Adjunct, Ph.D., University of Minnesota.

Robert D. Reeves, Ph.D., Iowa State University.

Carole S. Setser, Ph.D., Kansas State University.

Programs

The department offers M.S. and Ph.D. degrees in foods and nutrition. Students may emphasize one of the various food or nutrition sciences. Additionally, the department participates in the interdepartmental food science graduate degree program. Students in this program earn, M.S. and Ph.D. degrees in food science. The M.S. requires 30–35 credits for the thesis (6-8 credits), report (2 credits), and coursework-only options. The Ph.D. requires 90 credits, including a minimum of 30 credits for the Ph.D. dissertation. No foreign language is required. Biochemistry and statistics are required in the graduate program.

Programs of study are developed according to the interests, backgrounds, and career goals of the students. In addition to graduate foods and nutrition courses and the requirements listed above, students often include courses from other departments such as animal sciences and industry; grain science and industry; biochemistry; chemistry; anatomy and physiology; kinesiology; psychology; and biology; from the Colleges of Business Administration and Education; and from interdisciplinary international courses.

Admission

Entering students are expected to have a bachelor's degree from an accredited institution. Admission to graduate study at Kansas State University is granted on three bases: full standing, provisional, or probational. Recommendations concerning an applicant's qualifications and admission are made to the dean of the Graduate School by the department. The final decision regarding admission of an applicant is made by the dean of the Graduate School.

Admission in full standing requires a minimum grade point average of 3.0 (B average) in the last two years of undergraduate work in an institution whose requirements for the bachelor's degree are equivalent to those of Kansas State University. Applicants with grade point averages below 3.0 will be considered for probational admission provided there is evidence that the applicant has the ability to do satisfactory graduate work. Provisional admission may be granted to applicants who have subject deficiencies in undergraduate preparation or if there is uncertainty in evaluating the transcript. Normally, deficiencies will be made up by enrolling in courses for undergraduate credit. Entering students should have had college algebra, biology, organic chemistry, and other prerequisites for foods and nutrition courses.

Other admission requirements include a minimum GRE score of 1000 (v+q); copies of transcripts; 3 letters of recommendation; application; and statement of objectives. TOEFL scores (550) are required of all international applicants.

Applications are evaluated by the admissions committee. If the minimum requirements for admission are met applications are reviewed by graduate faculty.

A faculty member must agree to be an applicant's advisor before a recommendation can be made to the Graduate School that the applicant be admitted. The files of all applicants will be considered for institutional or departmental awards and graduate assistantships.

A limited number of 0.4 time teaching (GTA) and research (GRA) assistantships are available. In addition, Nina Browning Fellowships of up to $15,000 annually are awarded to outstanding students, as well as awards of lesser amounts to other students each year.

GTAs are appointed for nine months and GRAs for 9 or 12 months. Graduate assistants may enroll in 12 credit hours per semester and 6 credit hours per summer session. International students will be considered for assistantships after they have successfully completed one or two semesters of graduate work at K-State. Applications for admission will be considered for both fall and spring semesters and summer session. If an applicant is awarded a fellowship, a temporary advisor is assigned until a permanent advisor is chosen by the student during the first semester in residence. Fellowship awardees will be expected to participate in research or teaching during the term of the fellowship.

Funds for graduate students who are not on fellowships are primarily from ongoing research projects. The principal investigator (faculty member responsible) for each project selects graduate research assistants best suited for the specific project.

Research facilities and opportunities

Laboratory facilities

The Department of Human Nutrition has approximately 20,000 square feet for office, instruction, and research. Research laboratories and service areas comprise approximately 8,000 square feet. The department has a

1,500-square-feet animal laboratory that is fully accredited by the American Association for Accreditation of Laboratory Animal Care. In cooperation with the College of Veterinary Medicine, animals housed and maintained in our laboratory receive veterinary care to comply with the current NIH guidelines. A nutritional status assessment laboratory is used for both teaching and research activities and includes facilities for physical and dietary assessments.

Sensory Analysis Center

The Sensory Analysis Center was established in 1982 to provide professional sensory panel services to researchers at K-State, industry, and government. Students are encouraged to become involved in projects of the Sensory Analysis Center to gain practical knowledge for conducting sensory tests. The center uses both highly trained/experienced panelists and consumers, depending on the test objectives. Graduate students research projects conducted through the center include meat products, grain products, school lunches, and the effects of packaging on food products. Examples of other projects include: carbonated beverages, essential oils, fruits, vegetables, sauces, cookies, tea, fabrics, automotive paint, and paper.

Career opportunities

Graduate study in the foods and nutrition program prepares students for various academic positions. Graduates from our program are employed in the industry as directors of food product development and sensory evaluation divisions, senior food scientists, managers of quality assurance and test kitchens, directors of consumer services, and technical representatives; by hospitals and community organizations as dietitians or nutrition consultants; by universities and colleges as teachers and researchers; and by government agencies as extension specialists, nutritionists, and nutrition education coordinators.

AIB

Adjunct professors of the department are associated with the American Institute of Baking and private analytical laboratories in Manhattan and Kansas State University's Department of Kinesiology. Cooperative research may be arranged for selected students.

ADA qualification

The department's didactic program in dietetics is approved by The American Dietetic Association. After completing academic requirements, students may apply for an accredited internship at one of over 250 sites around the United States leading to the R.D. credential.

Foods and nutrition courses

Undergraduate and graduate credit in minor field

FN 500. Public Health Nutrition. (3) I. Public health nutrition issues for various segments of the population; nutritional components of community assessment; program planning and evaluation; and policy issues pertaining to the nutriontal status of the population. Pr.: FN 450.

FN 503. Maternal and Child Nutrition. (2–3) II. A study of the principles of prenatal, infant, and child nutrition emphasizing the practical application to life situations. Pr.: FN 132 and BIOL 198.

FN 520. Topics in Foods and Nutrition. (1–3) On sufficient demand. May be taken more than once for a maximum of 6 hours. Pr.: Junior standing and consent of instructor.

FN 550. Nutrient Metabolism. (4) I. Basic concepts of the mechanisms of actions, interactions, and the processes of cellular assimilation and utilization of nutrients in humans. Emphasis on the coordinated control of nutrient utilization among the major organs. Pr.: FN 400; BIOL 240; and BIOCH 521.

Undergraduate and graduate credit

FN 610. Life Span Nutrition. (3) I. Physiological and environmental influences on nutritional requirements; nutritional problems and eating patterns of age groups throughout the life cycle. Pr.: BIOCH 265 or 365; BIOL 240 or 526; and FN 400.

FN 630. Clinical Nutrition. (5) II. Nutrition in disease including physiological and biochemical basis of nutritional care, effects of disease on nutrient metabolism, diet therapy, nutrition assessment and nutrition counseling. Pr.: FN 550.

FN 635. Nutrition and Exercise. (3) I. The interrelationships among diet, nutrition, and exercise. Topics covered include physical fitness, weight control, nutrient metabolism during exercise, and athletic performance. Pr.: FN 132 or 400; KIN 250; and KIN 335. Cross listed with College of Arts and Sciences; see KIN 635.

FN 650. Practicum in Nutrition. (Var.) I, II, S. Supervised professional field experience in nutrition. Pr.: FN 450 and 500 and consent of instructor.

FN 660. Nutrition and Food Behavior. (3) I, in even years. Focus on the physiological, environmental, cultural, and economic factors that influence the use of food. Identification of appropriate methodology to study these factors as well as programs to modify food behavior. Pr.: PSYCH 110 or SOCIO 211 or ANTH 200; and FN 400.

FN 701. Sensory Analysis of Foods. (2–3) I. Sensory analysis of food appearance, texture, aroma, flavor; physiology of sensory receptors; laboratory and consumer panels; and interpretation of data. One hour rec. and three to six hours lab a week. Pr.: FN 501

FN 702. Nutrition in Developing Countries. (3) I, in odd years. Nutritional problems in developing countries, including an analysis of factors which contribute to malnutrition, effects of undernutrition, methods for assessing nutritional status, and interventions to combat nutrition problems. Pr.: FN 503 or 610.

FN 705. Food Product Development. (3) II. Development of food products including concepts, feasibility, formulation, evaluation, and production. One hour lec. and six hours lab a week. Pr.: FN 701 and 790.

FN 718. Physical Health and Aging. (3) I, in alternate odd years. Focus is on the physiological theories of aging, the relationship between normal aging processes, and the major chronic and acute diseases of the elderly, and community health promotion/maintenance programs for older adults. Pr.: BIOL 198 or 310; FSHS 510.

FN 741. Consumer Response Evaluation. (3) II. Odd years. Evaluation of consumer attitudes and perceptions of products to provide quantitative and qualitative information for research guidance. Design and implementation of consumer questionnaires and development of guides for focus groups and interviews. Two hours lecture and four hours lab a week. Pr.: FN 501 or 502 and STAT 320 or 330.

FN 750. Nutritional Aspects of Food Processing and Preparation. (2–3) I, in alternate years. Stability of nutrients during processing, storage, and preparation of foods from raw food to products for human consumption. Pr.: FN 501; FN 502; and BIOCH 200 or 521.

FN 780. Problems in Foods and Nutrition. (Var.) I, II, S. Laboratory and library experience in current problems in foods and nutrition. Three hours lab a week for each hour of credit. Pr.: FN 501 or 502.

FN 782. Topics in Foods and Nutrition. (1–3) On sufficient demand. May be taken more than once for a maximum of 6 hours. Pr.: Senior standing and consent of instructor.

Graduate credit

FN 810. Advanced Macronutrient Metabolism. (5) II, in even years. Dietary, metabolic, and endocrine factors regulating food intake and selection, and the absorption, function, metabolism, and interrelationships of macronutrients under varying nutritional conditions, with emphasis on recent advances in macronutrient nutrition. Pr.: BIOCH 521 and FN 550.

FN 812. Advanced Micronutrient Metabolism. (3) II, in even years. Nutritional roles and metabolism of vitamins and minerals. Functions, biological availability, hormonal regulation, requirements, deficiency and toxicity signs, and interrelations with other nutrients. Pr.: FN 810.

FN 819. Food Systems. (3) II. Chemical and physical principles and interactions of food components; functionality of proteins, lipids and carbohydrates in emulsions, foams and gels; processing and preservation effects on food components. Three hours lec. a week. Pr.: BIOCH 521 and FN 501.

FN 821. Practicum in Sensory Analysis. (2–3) I, II, S. Individual experiences applying sensory testing. Four hours of lab per week for each hour of credit. Pr.: FN 731 or FN 741 and consent of instructor.

FN 831. Descriptive Sensory Analysis. (3) II, in even years. Flavor and texture profiling and other descriptive techniques for use in product development, research, and quality control. Practical experiences in conducting tests and leading panels. Two hours lec. and two hours lab a week. Pr.: FN 701.

FN 844. Nutritional Epidemiology. (3) I. Methods and issues involved in understanding and conducting studies on the relationship between human diet and disease. Pr.: FN 400 and STAT 330 or STAT 702.

FN 880. Graduate Seminar in Foods and Nutrition. (1) II. Discussion of investigations in foods and nutrition. May be taken four semesters for credit. Pr.: FN 790 and 610.

FN 898. Master's Report. (Var.) I, II, S. Survey in depth of the literature.

FN 899. Master's Thesis. (Var.) I, II, S. Research in area of specialization.

FN 911. Advanced Nutrition: Contemporary Issues. (1–3), on demand. Contemporary concerns in health and disease from an advanced nutrition perspective. Pr.: FN 810.

FN 981. Food Science Colloquium. (1) I. Discussion of investigations in food science. Attendance required of all graduate students in food science. Maximum of 2 hours may be applied toward an M.S. degree or 4 hours toward a Ph.D. degree.

FN 999. Research in Foods and Nutrition. (Var.) I, II, S. Three hours a week for each hour of credit. Pr.: Consent of instructor.

For more information

For additional information and application materials please contact:

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213 Justin Hall
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E-mail: janetkay@ksu.edu
Home page: http://www.ksu.edu/humec/f&n/f&n.htm

Genetics

Genetics is an interdepartmental graduate program with faculty participants from many academic departments.

Chair

George H. Liang

Graduate faculty

R.W. Beeman, Ph.D., University of Wisconsin–Madison.

L. C. Davis, Ph.D., University of Yeshiva, New York.

Robin Denell, Ph.D., University of Texas–Austin.

Merle G. Eversmeyer, Adjunct, Ph.D., Kansas State University.

Bikram S. Gill, Ph.D., University of California–Davis.

Louis A. Heaton, Ph.D., Purdue University.

Charles Hedgcoth, Jr., Ph.D., University of Texas–Austin.

Scott H. Hulbert, Ph.D., University of California–Davis.

Srinivas Kambhampati, Ph.D., Simon Fraser University (Canada).

Michael Kanost, Ph.D., Purdue University.

Sanjay Kapil, Ph.D., University of Minnesota.

John F. Leslie, Ph.D., University of Wisconsin–Madison.

George H. Liang, Ph.D. University of Wisconsin–Madison.

Beth A. Montelone, Ph.D., University of Rochester.

Subbaratnam Muthukrishnan, Ph.D., Indian Institute of Science.

Gerald R. Reeck, Ph.D., University of Washington.

Paul St. Amand, Ph.D., North Carolina State University.

William T. Schapaugh, Jr., Ph.D., Purdue University.

Rollin G. Sears, Ph.D., Oregon State University.

Daniel Z. Skinner, Adjunct, Ph.D., Kansas State University.

C.M. Smith, Ph.D., Mississippi State University.

G.C. Stewart, Ph.D., University of Texas Health Center–Dallas

Donald L. Stuteville, Ph.D., University of Wisconsin–Madison.

X.Y. Tang, Ph.D., Purdue University.

Harold Trick, Ph.D., Florida State University.

A. Spencer Tomb, Ph.D., University of Texas–Austin.

D. L. Troyer, Ph.D., Kansas State University.

Mitchell Tuinstra, Ph.D., Purdue University.

Xueman "Sam" Wang, Ph.D., University of Kentucky–Lexington.

Frank F. White, Ph.D., University of Washington.

Jian-Min Zhou, Ph.D., Purdue University.

The genetics curriculum is sponsored by several departments to offer specialized education in genetics to students in multidisciplines. Graduate work leading to M.S. and Ph.D. degrees in genetics is administered by the faculty of participating departments. These departments are agronomy; biochemistry; entomology; plant pathology; veterinary medicine; and the Division of Biology. The genetics program consists of 30 full-time graduate faculty members and about 20 graduate students, several visiting scientists, and postdoctoral fellows. All faculty members direct active research projects, and there is a high degree of interaction and cooperation among researchers in various areas of genetics.

Graduate students are expected to start research in their first year and will receive individual attention and help. The objective is to produce graduates of the highest standard of quality. The curriculum is broad, including animal, physiological, molecular, microbial, fungal, yeast, population, quantitative and behavioral genetics, as well as cytogenetics, genetic engineering, tissue culture, and biotechnology in general. Flexibility is maintained to build a framework of fundamental information by which new findings and concepts can be assimilated as they arise in the rapidly changing field of genetics.

The genetics program is well equipped. Major research instruments include ultracentrifuges; high-speed and desktop centrifuges; HPLC, research-grade and fluorescent microscopes; electrophoretic apparatus; biolistic microprojectiles; spectrophotometers; thermocycler; PCR and gene cloning instruments; tissue culture facilities, such as laminar flow hoods, incubation and growth chambers, darkroom facilities, and computers; excellent greenhouse equipment with adequate space; and seed storage and field research related facilities.

Original research is of basic importance for graduate study. The small size of the research labs, averaging three to four students per lab, makes for close interaction within the group. Students are encouraged to attend and participate in seminars offered by participating departments.

Applicants will be carefully considered by faculty familiar with the academic and research achievements of the candidates. Out-of-state tuition is waived for students who are awarded graduate research or teaching assistantships. There is no language requirement besides English. Foreign stu-dents are expected to have a TOEFL score of 550 or better; the GRE is desired but not required.

Students who consider pursuing graduate careers at Kansas State University are encouraged to visit the university in order to meet with members of faculty and with other students and to form their own impression of the general atmosphere and of the many research possibilities.

Degree options and requirements

Master of science

A minimum of 30 credits is required with 6 to 8 research hours. Core courses include:

A statistics course (700 level).

A course in molecular biology, molecular genetics.

A course in biochemistry (500 level or higher).

Two additional genetics or breeding courses (plant, animal, or microbiology).

A minimum of 1 credit of graduate level seminar.

Scientific writing (1 cr.) is encouraged for foreign students.

Doctor of philosophy

A minimum of 90 credits is required, with typical course programs of 30 to 40 credit hours:

A statistics course (700 level or higher).

A course in molecular biology, molecular genetics, or nucleic acids.

A biochemistry course (700 level or higher).

Four additional genetics and/or breeding courses (plant, animal, or microbiology).

A minimum of 3 credits of graduate-level seminars may include seminars offered by participating departments; one of the seminar credits may be substituted by Scientific Writing, or by teaching a semester-long laboratory course; one of the three seminars must be an oral seminar presenting the candidate's research.

Core courses options

Agronomy

AGRON 770	Plant Genetics
AGRON 830	Quantitative Genetics in Relation to Plant Breeding
AGRON 860	Applied Plant Breeding
AGRON 910	Topics in Plant Breeding
AGRON 930	Topics in Plant Genetics
AGRON 970	Advanced Plant Breeding I
AGRON 980	Advanced Plant Breeding II

Animal science and industry

ASI 655	Behavior of Domestic Animals
ASI 749	Advanced Animal Breeding

Biochemistry

BIOCH 521	General Biochemistry
BIOCH 522	General Biochemistry Lab
BIOCH 755	Biochemistry I
BIOCH 756	Biochemistry I Lab
BIOCH 765	Biochemistry II
BIOCH 766	Biochemistry II Lab
BIOCH 890	Advanced Topics in Biochemistry
BIOCH 920	Nucleic Acids

Biology

BIOL 540	Molecular Biology
BIOL 551	Taxonomy of Flowering Plants
BIOL 615	Cytogenetics
BIOL 620	Evolution
BIOL 675	Genetics of Microorganisms
BIOL 676	Molecular Genetics Laboratory
BIOL 760	Genetic Engineering
BIOL 800	Advanced Plant Physiology I
BIOL 801	Advanced Plant Physiology II
BIOL 805	Advanced Mycology
BIOL 830	Advanced Virology
BIOL 860	Molecular and Cellular Biology
BIOL 888	Electron Microscopy Techniques

Entomology

ENTOM 799	Problems in Entomology (Evolutionary Genetics)
ENTOM 845	Insect Control by Host Plant Resistance
ENTOM 910	Insect Genetics

Horticulture, forestry, and recreational resources

HORT 780	Topics in Horticulture
HORT 846	Plant Research Methods
HORT 940	Plant Regulators in Horticulture

Plant pathology

PLPTH 613	Plant Disease Control
PLPTH 835	Plant Virology
PLPTH 860	Host Plant Resistance to Disease
PLPTH 911	Plant Tissue Culture and Regeneration
PLPTH 912	Molecular Approaches in Plant Pathology
PLPTH 915	Advanced Techniques in Cytogenetics
PLPTH 927	Fungal Genetics
PLPTH 930	Genome Analysis

Statistics	
STAT 703	Statistical Methods for Natural Scientists
STAT 704	Analysis of Variance
STAT 705	Regression and Correlation Analysis
STAT 716	Nonparametric Statistics
STAT 720	Design of Experiment
STAT 730	Multivariate Statistical Methods

For more information

For additional information and application materials please contact:
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Geography

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Graduate faculty
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Charles E. Bussing, (Emeritus), University of Nebraska.
David Darling, (Agricultural Economics) Ph.D., Ohio State University.
Karen J. De Bres, Ph.D., Columbia University.
Douglas G. Goodin, Ph.D., University of Nebraska.
John Harrington, Jr., Ph.D., Michigan State University.
Lisa M.B. Harrington, Ph.D., University of Oklahoma.
David E. Kromm, Ph.D., Michigan State University
Max Lu, Ph.D., University of Indiana.
Kamlesh Lulla, (N.A.S.A.) Ph.D., Indiana State University.
Charles W. Martin, Ph.D., University of Kansas.
Bimal K. Paul, Ph.D., Kent State University.
David R. Seamon, (Architecture) Ph.D., Clark University.
Huber Self, (Emeritus), Oklahoma A and M
H. L. Seyler, Ph.D., University of Indiana.
William R. Siddall, (Emeritus), University of Washington
Ben A. Smith, (Education) Ph.D., University of Georgia.
Stephen L. Stover, (Emeritus) University of Wisconsin.
Stephen E. White, Ph.D., University of Kentucky.

Overview

The Department of Geography offers the Ph.D. in geography with an emphasis in rural geography. The thematic emphases within the program include the spatial dimensions of agricultural activities, rural economic development, natural resources evaluation and management, rural population redistribution and impacts, rural settlement and sustainability, climatology, medical geography, and the utilization of spatial techniques (remote sensing, computer cartography, and geographic information systems) to help solve geographic research questions.

The master of arts degree in geography at Kansas State University has been recognized as one of outstanding quality in reviews by the Kansas Board of Regents, the College of Arts and Sciences, and the Graduate School. Former geography graduate students excel in Ph.D. programs and assume important positions in the public and private sectors. Recent graduate students in our program have received prestigious Fulbright, Pearson, NASA, and GTU fellowships.

Advanced work consisting of classes and seminars is offered as part of a master of arts curriculum. Close supervision of the thesis research and frequent visits by geographers from other universities help provide a thorough and well-balanced program. The moderate size of the geography department makes possible an informal atmosphere and a close rapport among faculty and graduate students.

Kansas State University geography faculty research strengths in natural resources, climatology, human-environmental interaction, rural development, and emerging technologies/spatial analysis techniques (e.g., geographic information systems, remote sensing, and micro-cad cartography) creating an exciting environment for graduate work. Current sources of geography extramural support include the National Aeronautics and Space Administration, National Science Foundation, National Institutes for Global Environmental Change, National Geographic Society, Natural Resources and Conservation Service, and the Association of American Geographers.

Other parts of the university offer further opportunities for enrichment of the geography graduate student's program. Advanced study is possible in such areas as regional economic analysis, regional and community planning, natural resources management, ecology, and demography.

The geography department is centrally located on campus and housed on the second and third floors of Dickens Hall. Graduate students have access to numerous microcomputers throughout Dickens Hall. Other resources in the department which enhance graduate work include: a geographic information systems/spatial analysis laboratory with remote sensing, digital image processing systems, microcomputers, computer mapping and geographic information system software, remote sensing imagery and photogrammetric instrumentation; a global positioning system; an optical map-enlarging/reducing machine; a large collection of topographic and wall maps; and, a small reference library. The university library, only a one-minute walk from Dickens Hall, contains a large number of geographical journals. Also nearby are the Kansas Population Lab, the Kansas Water Resources Research Institute, Konza Prairie Research Preserve, and University computing center.

Ph.D. program

The geography Ph.D. at Kansas State University is designed to develop the student's ability to conduct original research in the geography of rural studies. To earn the Ph.D. in geography, students must complete 30 credit hours of course work beyond the master's degree and 30 credit hours of dissertation research, for a total of 60 credit hours; complete a foreign language and analytical skills package; pass a preliminary examination that covers the student's field of specialization; spend at least one full academic year in residence; and produce a written dissertation of rural research that makes an original contribution to knowledge. Included in the required 30 credit hours of course work are the following required courses: GEOG 900 Methods, Theory, and Models in Geography; GEOG 800 Graduate Colloquim I; and GEOG 830 Seminar in Rural Resource Management. Students also must have completed courses in physical geography, economic geography, history and philosophy of geography, regional geography, and one of the spatial techniques (cartography, remote sensing, computer mapping, or geographic information systems). To satisfy the foreign language requirement, the student must demonstrate a reading knowledge of one foreign language based on standards established by the Department of Modern Languages at Kansas State University. The analytical skills requirement can be met by completion of a sequence of courses in a research skill relevant to the student's program (e.g., statistics, computer programming, or other).

M.A. program

All geography candidates for the master of arts degree are required to take GEOG 700 Quantitative Analysis in Geography (except Option B students); GEOG 800 Graduate Colloquium I; GEOG 801 Graduate Colloquium II; and GEOG 820 History and Philosophy of Geography. Students may choose, in consultation with their advisors, one of the three programs leading to the M.A. degree.

Thesis option
This option requires 30 hours of graduate credit including 6 hours of credit for a thesis. Of the 24 hours of credit required in course work, at least 15 hours must be in geography.

Report option for teachers
Option B is for students who intend to pursue or continue careers in public school or junior college teaching. It is open only to persons who are already certified to teach at the public-school or junior-college level in any state, or to those who will make courses required for such certification an integral part of their program. Thirty hours of graduate course work are required, including two credits of GEOG 898 Master's Report, which shall consist of the design of a teaching syllabus in some subfield of geography. At least 18 credit hours must be in geography. This option is not suitable for any student who may ultimately continue for the doctorate.

Report option
This option is a nonthesis program designed for students who have a specific professional goal in mind other than teaching at any level, and who do not intend to continue for a Ph.D. The student may choose from several approved course groupings. Thirty-two hours of graduate-level work are required; including a two credit hour report (GEOG 898 Master's Report). Up to 12 hours may be outside the geography department.

Admission procedures

Regular admission to the Graduate School requires a 3.0 grade point average on a 4.0 scale, plus three letters of recommendation from professors and submission of GRE scores. Ph.D. applicants should have attained a score of at least 1200 on the combined verbal and quantitative components of the GRE. In some cases applicants with less than a 3.0 average may be admitted on a provisional basis. Students entering the geography graduate program must also have course preparation in regional geography, economic geography, physical geography, cartography, and statistics. Regular admission can be granted, however, contingent on the students addressing these core subject areas.

Financial support

Several graduate teaching assistantships and some graduate research assistantships are available on a competitive basis. Full-time graduate teaching assistants receive a 100 percent waiver of tuition, a partial waiver of graduate fees and a remuneration of about $7,400 for a nine-month appointment. Graduate research assistants, supported from geography faculty research programs, include a remuneration at about $9,000 for a nine-month appointment, and also include an out-of-state fee waiver with some reduction of in-state fees. A limited number of Graduate School fellowships can also enhance graduate stipends. Graduate assistantships are continued for a second year assuming adequate scholastic and teaching/research performance.

Career opportunities

Career opportunities in geography are diverse, and employment prospects after receipt of the master's degree are excellent. Employment opportunities vary from positions in business and government to jobs in planning and education.

Career opportunities for geographers with expertise in environmental studies have never been better. Federal agencies, such as the Environmental Protection Agency, Defense Mapping Agency, and Bureau of Land Management employ numerous geographers each year.

The geographer's training in location analysis, social, and environmental problems, and a variety of techniques, including remote sensing, geographic information systems, and computer cartography, make the geographer particularly valuable in the private sector. Business career opportunities in this sector are numerous. Demographer, market researcher, area analysts, travel agent, and location analyst are just a few of the varied job titles held by geographers in business.

Geography courses

GEOG 500. Geography of the United States. (3) I. In odd years. A regional analysis of the United States with special attention to the historical, political, economic, and social factors which contribute to areal differentiation within the area.

GEOG 505. Introduction to the Civilization of South Asia I. (3) I. Interdisciplinary survey on the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, philosophical and social concepts, social and political institutions, literature and historical movements. Same as ECON 505, HIST 505, POLSC 505, SOCIO 505, ANTH 505.

GEOG 506. Introduction to the Civilization of South Asia II. (3) II. Interdisciplinary survey of recent and contemporary civilization of India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion culture, language and literature, geography, social and political structure and ideas. Same as ECON 506, HIST 506, POLSC 506, SOCIO 506, ANTH 506.

GEOG 508. Fundamentals of Geographic Information Systems. (3) II. Examinations of the major concepts, theories, and operations in geographic information systems (GIS). Topics include: the nature of geo-referenced data, data acquisition, and spatial database management, coordinate systems and maps, data structure, and the basic GIS operations that are available for spatial analysis. The course will consist of two hours of lec. and two hours of lab a week.

GEOG 535. Fundamentals of Climatology. (3) II. An examination of climatology on global, regional, and local scales, with emphasis on the physical processes and environmental factors that influence and control climate. Climatic change and its impact on human activities are explored.

GEOG 555. Cartography: MicroCAD. (3) I. Theory and methods of thematic mapping. Features CAD-based approach to mapping projects including choropleth, isopleth, quantitative and qualitative symbol, and cartograms. Students will produce a collection of publication quality graphics. Pr.: STAT 330.

GEOG 610. Geography Internship. (2–3) I, II. Faculty-supervised field experience, emphasizing the application of geographical topics and/or techniques. Student projects must be approved by both the on-site director and the faculty supervisor and a report must be submitted at the end of the semester. Pr: Permission of the instructor and junior standing in geography are requried.

GEOG 620. Geography of Latin America. (3) II, in even years. A broad survey of the physical and human patterns of the Latin American culture area, past and present, with emphasis on the changing landscape features in the successive patterns of human occupancy.

GEOG 640. Geography of Europe. (3) II. People and their environment, their cultures, problems, and prospects in Europe west of the Soviet Union; trends of development as affected by changing political and economic factors.

GEOG 650. Geography of Former Soviet Lands. (3) II. In odd years. Physical limitations, resource potentials, economic capabilities, and political and nationality issues, with particular emphasis on agriculture, manufacturing, urbanization, cultural diversity, and regional development. Pr.: Six hours of social science.

GEOG 680. Seminar in Regional Geography. (1–3) Pr.: Consent of instructor.

GEOG 700. Quantitative Analysis in Geography. (3) II. Quantitative methods employed in modern geographical research. Applications of both statistical and mathematical approaches will be treated. Emphasis will be placed on interpretation and evaluation of techniques employed in spatial analysis. Pr.: One course in statistics.

GEOG 702. Computer Mapping. (3) I. Familiarizes students with computer applications to mapping problems. Students will produce a series of maps on the printer and plotter using prepared programs and, in the process, develop computer graphics skills to address problems in areal analysis, planning, and public administration. Pr.: One course in social science and one in natural science and junior standing.

GEOG 705. Remote Sensing of the Environment. (3) I, II. Remote sensing and its application to earth study, especially environmental problems and land use. Course employs both readings and the use of imagery. Two hours lec., two hours lab. Pr.: One course in physical science and one in biological science.

GEOG 708. Geographic Information Systems. (3) II. Examines both theoretical and applied dimensions of geographic information systems (GIS) in the contexts of environmental impact analysis, natural resource inventories, and community development studies. Applications of GIS concepts and procedures will be built around the use of PC ARC-Info, where case studies will be completed by teams of students. Pr.: GEOG 702 or GEOG 705.

GEOG 709. Geography Field Research Techniques. (Var.) Explore methods and techniques employed in modern geographic field research. Research design, techniques for acquisition of data in the field, and analysis of data will be stressed.

GEOG 711. Topics in Remote Sensing. (3) II. Examination of a selected remote sensing topic in an area of faculty specialization. Repeatable once with change in topic. Pr.: GEOG 705.

GEOG 715. World Population Patterns. (3) I, in even years. Geographical processes that govern population distributions, growth rates, and migrations. Emphasis on international comparisons and implications for world society of continued differential growth rates Pr.: Six hours of social science.

GEOG 718. Geography of Public Lands. (3) II. Overview of public lands systems, including distribution and uses of public lands, with an emphasis on US federal lands. Historic and recent controversies regarding the public lands will be addressed. Seminar course with discussion and independent research components. Pr.: Six hours of social science.

GEOG 720. Geography of Land Use. (3) I, in odd years. Critical factors affecting land use, scarcity, and management examined in a regional, national, and global context; land use classification system and variation of land use patterns. Pr.: Six hours of social science.

GEOG 725. Geography of Water Resources. (3) II, in even years. Interpretation and analysis of the physical geography of water and water as a resource. Evaluation of water, emphasizing quality, hazards, institutions, and selected domestic and global issues. Pr.: Six hours of social science.

GEOG 730. World Agricultural Systems. (3) II, in odd years. Description and analysis of the spatial distribution of farm systems emphasizing traditional resource systems in the third world. The major objective is to analyze the interrelationships between natural and human elements in farm systems in order to gain an awareness and understanding of the complex issues involved in agricultural change and development. Pr.: Six hours of social science.

GEOG 735. Topics in Climatology. (3) I. Examination of a selected climatology topic in an area of faculty specialization. Repeatable once with change in topic. Pr.: GEOG 535.

GEOG 750. Urban Geography. (3) I. A study of geographic principles relating to the distribution, function, and structure of cities: a geographic analysis and classification of urban settlements. Pr.: Six hours of social science or planning.

GEOG 760. Human Impact on the Environment. (3) I. Assessment of human impacts on the natural environment. Surveys changing human impacts on and attitudes towards the environment, and detaiIs alteration of water systems, the atmosphere, landforms, pIants, and animals. Pr.: Six hours of social science.

GEOG 780. Cultural Geography. (3) II, in even years. A study of the forms of human occupancy of landscapes, with consideration of innovations in the use of landscape, the origins and the dispersals of these innovations, and human attitudes toward the naturaI environment. Pr.: Six hours of social science.

GEOG 790. Seminar in Cultural-Economic Geography. (1–3) Pr.: Consent of instructor.

GEOG 800. Graduate Colloquium I. (2) I. An introduction to graduate level study in geography and to several sub-fieIds of the discipline. Required of all graduate students majoring in geography.

GEOG 801. Graduate Colloquium II. (2) II. The nature of geographic research and the processes involved in its structuring, development, and articulation. Each student will produce and present a formal Master's thesis proposaI. Required of all graduate students majoring in geography.

GEOG 815. Rural Population Geography. (3) I, in even years. An examination of the population dynamics responsible for regional change in rural areas of the United States. Emphasis is placed on migration systems and changing population composition in Appalachia, Great Plains, rural South, and the Midwest. Pr.: STAT 702 or GEOG 700 or equiv., and GEOG 715 or SOCIO 830.

GEOG 820. History and Philosophy of Geography. (2) I. A critical examination of the aims and methods of geography, especially in terms of its historical deveIopment and its logical structure. Pr.: Open to all graduate students in social sciences.

GEOG 830. Rural Resource Management. (3) I. Examines the naturaI resource base supporting rural habitation, and the threats to resource sustainability and management response; explores forces of instability to which ruraI land use decision-makers have had to adapt; considers rural resources in Great Plains context. Topics may vary. Pr.: GEOG 440.

GEOG 835. Rural Economic Development. (3) I. Applications of regional and community development models in rural areas of North America. Emphasis is pIaced on case studies of locational relationships between regional economic profiles, including changes in structure, and indices of betterment. Pr.: GEOG 700 or 700-level statistics course.

GEOG 840. Advanced Environmental Geography. (3) I, in odd years. An examination of post-European settlement land use and climate changes and their impact on rural landform stability. Emphasis is on the response of upIands and river systems to land use and climate change and the techniques for documenting historical landform change. Pr.: GEOG 221; GEOL 520.

GEOG 850. Topics in Environmental Geography. (1–3) I, II, S. Pr.: Consent of instructor.

GEOG 855. The Rural Cultural Geography of the United States. (3) II, in even years. An examination of the development and distribution of the rural cultural landscapes, focusing particularly on elements of the material landscape. Emphasis is placed upon research conducted in the Great Plains. Pr.: GEOG 500.

GEOG 860. Topics in Economic Geography. (1–3) I, II, S. Pr.: Consent of instructor.

GEOG 865. Rural Medical Geography. (3) II, in odd years. Emphasizing the pattern of social and environmental conditions on health and disease, this course examines medical care systems and health issues in rural areas of both developed and developing countries. Pr.: STAT 702 or GEOG 700.

GEOG 870. Topics in Cultural Geography. (I–3) I, II, S. Pr.: Consent of instructor.

GEOG 890. Advanced Spatial Analysis Techniques. (3) II. Integration of spatial analysis techniques and models with tools such as Geographical Information Systems and Remote Sensing as applied to rural resource systems. Explores strategies for adaptation of various types of spatial models into the GIS framework. Sources of data for anaIysis will be considered with special emphasis pIaced on use of remotely sensed data. Pr.: GEOG 705 and 708; GEOG 700 or STAT 702.

GEOG 898. Master's Report. (2) I, II, S. For students enroIled in geography option B. Pr.: Registration in Graduate School, with sufficient training to carry on the line of research undertaken. Consent of instructor.

GEOG 899. Master's Thesis. (6) I, II, S. For student enrolled in geography option A. Pr.: Registration in the Graduate School, with sufficient training to carry on the line of research undertaken. Consent of instructor.

GEOG 900. Methods, Theory, and Models in Geography. (3) I. Comparative analysis of contemporary methodology of geographic explanation showing their development, current status and future trends. Examination of problems and techniques of design, data collection, analysis, and interpretation which accompany particuIar research themes. Pr.: M.A. and consent of instructor.

GEOG 905. Advanced Quantitative Methods in Geography. (3) II. An examination of various multivariate statistical methods used in geographic research for spatial data analysis. Pr.: GEOG 700 or STAT 702.

GEOG 990. Research Problems in Rural Geography. (Var) I, II. Individual study and research for students admitted to doctoral standing in the graduate school. Pr.: M.A. and consent of instructor.

GEOG 999. Ph.D. Dissertation Research. (Var.)

For more information

For additional information and application materials please contact:
David E. Kromm
Geography Graduate Program
Kansas State University
201 Dickens Hall
Manhattan, KS 66506–0801
785-532-6727
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Geology

Head
Charles G. (Jack) Oviatt

Director of graduate studies
Mary Hubbard

Graduate faculty
Allen W. Archer, Ph.D., Indiana University.

Sambhudas Chaudhuri, Ph.D., Ohio State University.

George R. Clark II, Ph.D., California Institute of Technology.

Robert L. Cullers, Ph.D., University of Wisconsin.

Mary S. Hubbard, Ph.D., Massachusetts Institute of Technology.

Thomas J. McCahon, Ph.D., University of Wyoming.

Keith B. Miller, Ph.D., University of Rochester.

Charles G. Oviatt, Ph.D., University of Utah.

Ronald R. West, Ph.D., Univcrsity of Oklahóma.

Program description

The Department of Geology offers a graduate program leading to the M.S. degree in geology. Graduate degrees are essential for those who want careers as professional geologists in business, government, or higher education. The M.S. program in geology at Kansas State University is designed to provide the student with the understanding and ability to apply geological, chemical, physical, biological, and mathematical principles to the solutions of problems related to environmental management, mitigation of natural disasters, and use and management of natural resources. It is also geared to prepare students for further graduate study or professional employment. Students in the program take at least 30 hours of course and research work and complete a master's thesis.

The department has nine full-time graduate faculty members and approximately 10 graduate students. Research emphases include stratigraphy, sedimentary geology, and paleobiology of the mid-continent; subsurface waters and water-rock interactions in aquifers, oil-fields, and ore systems; water quality and contamination assessments; surficial geology and geologic mapping in Kansas and Utah; structural geology and tectonics of mountain belts; geochemical studies of igneous and sedimentary rocks; computer applications in geology; and earth-science education.

The Department of Geology has active collaborations with a number of organizations, including K-State's Center for Science Education, the Kansas Geological Survey, the Department of Geology at the University of Kansas, and the U.S. Geological Survey.

The Department of Geology occupies all of Thompson Hall and has the following research equipment and facilities: isotopic geochemistry laboratories; student and faculty computing laboratories; X-ray diffraction laboratory; atomic absorption laboratory; rock and mineral preparation facilities; and cathode-luminescence microscope. Electron microscopes, scanning electron microscope, X-ray facilities, an ion-coupled plasma emission analysis unit, and a 100-kv nuclear reactor, 4096 multichannel analyzers, and Li-drifted Germanium detectors are in the departments of entomology, physics, chemistry, and nuclear engineering. The university area contains excellent outcrops and is well situated for field work in sedimentary petrology, geochemistry, stratigraphy, groundwater geology, soils, petroleum geology, midcontinent-type structure, invertebrate paleobiology, and paleoecology. Graduate student offices are equipped with Pentium-based PCs, which are Ethernet-connected to the campus UNIX system. All faculty and student computers have full Internet connectivity.

Full-time graduate students in residence are supported for two academic years. Awards include graduate teaching and research assistantships and scholarships. The department also has two endowed, student travel funds. Tuition is waived for graduate teaching assistants.

Application forms for admission and graduate assistantships can be obtained from the Graduate Advisor, Department of Geology,

Kansas State University, 108A Thompson Hall, Manhattan, Kansas 66506–3201, or from the department's web site.

Applications to the M.S. program should be accompanied by: (1) college transcript(s), (2) three letters of recommendation, (3) GRE scores (including advanced geology examination), and (4) a statement of career goals and interests. To ensure consideration, applications for financial assistance should be received by March 1.

Master of science degree

Research leading to the M.S. thesis is the most important part of graduate study in geology at Kansas State University. Students usually select a faculty advisor and develop research and course plans during their first term and begin the research project during their second term. The minimum requirements for the M.S. degree in geology are 30 semester hours of graduate courses under one of the following options:

Option A

Thesis option. This option, required of all students entering the graduate program as teaching or research assistants, requires the satisfactory completion of a master's thesis. Six credit hours of GEOL 899 Master's Thesis Research may be included in the 30-hour requirement.

Option B

Report option. This option is available to those students who have limited time for completion of a degree and are not contributing to the department's teaching or research efforts. Students choosing this option might include foreign students fully supported by their governments, or military personnel supported by the U.S. government, planning intense courses of study to complete the M.S. degree in the shortest possible time. Other students might include professional educators at the public school or community college level, or professional geologists with full-time employment, planning part-time studies to complete the M.S. degree over a period of years.

Under the report option, students will not complete a thesis but will be required to satisfactorily complete a substantive report, representing a scholarly effort in the research or practice of geology. Two credit hours of GEOL 898 Master's Report Research may be included in the 30-hour requirement.

K-State–KU joint Ph.D.

Program The Department of Geology cooperates in the Ph.D. program in geology at the University of Kansas. Candidates for the Ph.D. degree who wish to study with a faculty member from Kansas State University are admitted to the degree program at the University of Kansas and spend one year of residence there. The remaining course and research activity is carried out at Kansas State University. Interested students should contact both departments and obtain application materials from: Director of Graduate Studies, Department of Geology, University of Kansas, Lawrence, Kansas 66045–2124.

Geology courses

Undergraduate and graduate credit in minor field

GEOL 501. Independent Study in Geology. (1–3) I, II, S. Independent reading; field or laboratory investigations, or both, of geologic problems. Pr.: GEOL 300 and junior standing.

GEOL 502. Mineralogy. (3) I. Crystallography; physical and chemical properties of minerals; descriptive mineralogy. Two hours lec. and three hours lab a week. Pr.: GEOL 100 or 105, 130, and CHM 230.

GEOL 503. Petrology. (3) II. Petrology of igneous, metamorphic, and sedimentary rocks. Two hours lec. and three hours lab a week. Pr.: GEOL 502.

GEOL 506. Environmental Studies. (2) I, II, S. Physical and chemical qualities of natural environments and health from a geologic perspective-detection and prediction of environmental changes, identification of sources of pollutants and their movements in soils, rocks, and waters. Pr.: GEOL 100.

GEOL 510. Geology of Planets. (3) I. Origin, evolution, and surficial geology of the extraterrestrial planets and satellites. Three hours rec. a week. Pr.: GEOL 100.

GEOL 512. Earth Science. (3) I, II. A critical study of the atmosphere, weather, climate, composition, and processes of the earth; also, the interaction of these in producing the pattern of landforms and human activity. Three hours rec. a week. Pr.: GEOL 100 or GEOG 220 or junior standing.

GEOL 515. Geology of the National Parks. (3) On sufficient demand. Stratigraphy, structure, and geological history that produced the scenery of the national parks. Selected national monuments also will be studied. Pr.: GEOL 100 or 105.

GEOL 520. Geomorphology. (2) I, II. Laboratory exercises in reading and interpreting topographic maps and aerial photographs; field studies of landforms and surficial deposits, with an emphasis on earth-surface processes. One hour rec. and three hours lab a week. Pr.: GEOL 100.

GEOL 530. Structural Geology. (3) II. Mechanics of the earth's crust; origin and interrelation of structures of the earth. Two hours rec. and three hours lab a week. Pr.: GEOL 503.

GEOL 540. Ice Ages and Environmental Change. (3) I. Studies of the recent geologic past, especially of the last major ice age to the present. Causes of glaciation and climactic change, ways of reconstructing past geologic environmental and geologic environmental changes during the time when human civilization developed, including recent historic time. Three hours rec. a week. Pr.: GEOL 100 or GEOG 221.

GEOL 581. Paleobiology. (4) I. Biological principles applied to fossils; introduction to contributions of pro- and eukaryotic organisms, especially algae and marine invertebrates to earth history. Two hours rec. and six hours lab a week. Pr.: GEOL 300 and 503; MATH 220; PHYS 114.

GEOL 599. Senior Thesis. (1–3) I, II. Directed research and preparation of a senior thesis. May be repeated once to a maximum of 3 hours credit. Open only to seniors in geology or geophysics.

Undergraduate and graduate credit

GEOL 602. Mineral Exploration. (3) I, II. Geological, geochemical, and geophysical prospecting techniques and their application in the exploration for metallic mineral deposits. Three hours rec. a week. Pr.: GEOL 503.

GEOL 605. Exploration Geophysics. (3) I. Seismic, gravity, magnetic, and electrical methods used in geophysical exploration for petroleum accumulations and for mineral deposits. Three hours rec. a week. Pr.: PHYS 214; GEOL 530.

GEOL 608. Optical Mineralogy-Petrography. (3) I. Identification of minerals and rocks as crushed fragments and in thin section. Two hours lec. and one four-hour lab a week. Pr.: GEOL 503 and PHYS 214 or 114.

GEOL 610. Sedimentary Geochemistry. (3) I, II. Geochemical principles and processes in deposition and diagenesis of sediments; different chemical pathways in the exogenic cycle. Two hours rec. and three hours lab a week. Pr.: GEOL 503 and MATH 220.

GEOL 611. Hydrogeology. (3) I, II. Origin, geologic occurrence, and migration of subsurface water; laws governing ground water flow and yield of acquifers. Three hours rec. a week. Pr.: GEOL 520.

GEOL 630. Stratigraphy-Sedimentation. (4) II. Description, classification, correlation, chronology, and paleogeography of sedimentary rock systems and the depositional environments in which they formed. Three hours rec. and three hours lab a week. Pr.: GEOL 581.

GEOL 680. Field Geology. (6) S. Geologic mapping projects along the Colorado Front Range using Brunton compass, aerial photographs, topographic maps, and plane table; special problems in stratigraphy, structure, and petrology. Five six-day weeks in the field. Pr.: GEOL 503, 520, and 530.

GEOL 702. Economic Geology. (3) I. Geology and origin of metallic mineral deposits and of some nonmetallic deposits. Three hours rec. a week. Pr.: GEOL 503.

GEOL 703. Economic Geology Laboratory. (1) I. Laboratory activities related to metallic and nonmetallic mineral deposits, including detailed studies of selected deposits. Pr.: GEOL 702 or conc. enrollment.

GEOL 704. Paleoecology. (3) I. Application of biological, physical, and chemical factors in modern marine environments to the quantitative study of the structure and dynamics of fossil populations and communities. Two hours rec. and three hours lab a week. Pr.: GEOL 581.

GEOL 705. Geobiology. (3) II. Discussion and critique of current and classic research in geobiology. Three hours rec. a week. Pr.: GEOL 581.

GEOL 711. Water Resources Geochemistry. (2) II. Geochemistry of ground and surface waters; emphasis on mineralogic and hydrologic controls on inorganic constituents and properties. Two hours rec. a week. Pr.: GEOL 503 or AGRON 705 or 755.

GEOL 712. Advanced Geochemistry. (3) II. Application of chemical principles to igneous, metamorphic systems; emphasis on equilibria, oxidation-reduction, crystal chemistry, and thermodynamics. Three hours lec. a week. Pr.: GEOL 503 and CH 500 or 585.

GEOL 720. Quaternary Geology. (3) II. Quaternary stratigraphy as the framework for studying the geomorphic, climactic, archaeological, and biological changes of the last two million years, with emphasis on the North American record. Three hours rec. a week and one field trip a semester. Pr.: GEOL 630.

GEOL 730. Petroleum Geology. (3) I, II. Origin, migration, and accumulation of petroleum; stratigraphy and structure of important fields. Three hours rec. a week. Pr.: GEOL 530 and 630.

GEOL 740. Regional Geology. (3) I. Structure and stratigraphy of the major tectonic units of North America. Pr.: GEOL 530, 630.

GEOL 770. Subsurface Methods. (3) II. Principles and applications of subsurface geology. Two hours rec. and three hours lab a week. Pr.: GEOL 530 or conc. enrollment.

GEOL 790. Problems in Geology. (Var.) I, II, S. Work is offered in mineralogy, paleobiology, paleoecology, stratigraphy, structural geology, igneous, metamorphic, and sedimentary petrology, geomorphology, planetary geology, hydrogeology, geochemistry, and isotope geology. Pr.: Background of courses needed for problem undertaken.

Graduate credit

GEOL 800. Graduate Seminar in Geology. (Var.) I, II. Topics in geology, geochemistry, and geophysics.

GEOL 801. Advanced Paleobiology. (2) On sufficient demand. Detailed study of the functional morphology, ecology, biogeography, evolution, and classification of selected groups. Pr.: GEOL 704 or 705.

GEOL 804. Igneous and Metamorphic Petrology. (4) On sufficient demand. Selected problems in the petrogenesis of igneous and metamorphic rocks. Three hours lec. and three hours lab a week. Pr.: GEOL 608.

GEOL 805. Advanced Igneous and Metamorphic Petrology. (2) On sufficient demand. Field and laboratory study of selected problems in the origin of igneous and metamorphic rocks. Pr.: GEOL 804.

GEOL 806. Sedimentary Petrology. (4) II. Petrography, classification, and origin of terrigenous and chemical sedimentary rocks. Three hours lec. and three hours lab a week. Pr.: GEOL 608.

GEOL 807. Advanced Sedimentary Petrology. (2) I, II. Field and laboratory study of selected problems in the origin of sedimentary rocks. Pr.: GEOL 806.

GEOL 810. Isotope Geology. (3) I. Principles, techniques, and applications of natural radioactive isotopes to geochronology; application of isotopes to problems of petrogenesis. Three hours rec. a week. Pr.: GEOL 608 or consent of instructor.

GEOL 830. Geotectonics. (3) I. Origin and history of major tectonic elements of the earth, especially their interaction through time. Pr.: GEOL 530.

GEOL 840. Planetology. (3) II. Geologic principles applied to a study of the solar system. Pr.: GEOL 530, 712, or consent of instructor.

GEOL 880. Clay Mineralogy. (3) II. Geologic occurrences, physical properties, atomic structures, and the identification of clay minerals, including thermal analytical methods and the study of X-ray diffraction patterns. Two hours rec. and three hours lab a week. Pr.: GEOL 503 or 711 or AGRON 515.

GEOL 898. Master's Report Research. (1–2) I, II, S. Research or practice of geology summarized in a scholarly report. Pr.: Enrollment in geology option B and permission of instructor.

GEOL 899. Master's Thesis Research. (1–6) I, II, S. Research in geology culminating in a master's thesis. Pr.: Enrollment in geology option A and permission of instructor.

GEOL 999. Research in Geology, Ph.D. (Var.) I, II, S.

For more information

For additional information and application materials please contact:
Graduate Advisor
Department of Geology
Kansas State University
108A Thompson Hall
Manhattan, KS 66506–3201
E-mail: mhub@ksu.edu
Home page: http://www.ksu.edu/geology/

Gerontology

Director
Lyn Norris-Baker

Kansas State University faculty who have expertise in aging-related issues may be members of the gerontology faculty. Contact the Center for Aging for a listing of current members.

Program description

Graduate emphasis in gerontology
Kansas State University does not offer a graduate degree in gerontology, but provides the option of completing an interdisciplinary emphasis in gerontology in addition to the student's disciplinary degree. The graduate emphasis in gerontology is designed to be taken concurrently with a disciplinary graduate degree program at the master's or doctoral level. The program requires 14–18 credit hours, some of which may overlap with requirements for the student's disciplinary degree.

Emphasis in long-term care administration
Graduate students interested in a career in long-term care administration also may complete the emphasis in long-term care administration. Students completing this program are automatically eligible to take the Kansas nursing home administrator licensing examination.

Program requirements

Entrance requirements
To be admitted to the graduate emphasis in gerontology, the applicant must be enrolled in a graduate degree program at Kansas State University.

Required curriculum
One course approved for gerontology credit in the student's discipline at the 700 level or above (3 credit hours)

Two graduate courses approved for gerontology credit in disciplines other than the student's own (6 credit hours)

Practicum in a setting relevant to gerontology (3 credit hours)

Master's project, thesis or report, or doctoral dissertation with a gerontological focus or relevance to aging (2–6 credit hours)

Requirements for emphasis in long-term care administration
Students who currently possess a bachelor's degree must complete (or have completed) courses in core knowledge areas defined by the Kansas Bureau of Health Facility Regulation, Health Occupations Credentialing. These include sociology, psychology, and/or human development and aging, biology and/or physical health and aging, an elective course in gerontology, accounting, and health care or business management. In addition, students must complete GERON 610: Seminar in Long-Term Care Administration and GERON/DHE 615: Long-Term Care Administration Internship. Courses taken to fulfill requirements for the graduate emphasis in gerontology and/or the disciplinary degree may be used to meet some of the requirements for the emphasis in long-term care administration.

Departmental electives
See appropriate degree programs in this catalog for further descriptions.

Undergraduate credit and graduate credit in minor field

FSHS 510	Human Development and Aging
FSHS 525	Estate Planning for Families
HIST 520	Death and Dying in History
HIST 534	Social History of American Medicine
HORT 525	Horticulture for Special Populations
PSYCH 518	Intro to Health Psychology
PSYCH 520	Life-Span Personality Development
SOCIO 535	Population Dynamics

Undergraduate and graduate credit

ARCH 730	Environment and Aging
ARCH 740	Building-Related Health and Safety[2]
FN 610	Life Span Nutrition
FN 718	Physical Health and Aging
FSHS 654	Death and the Family
FSHS 704	Seminar in Family Studies and Human Services
FSHS 770	Economics of Aging
IDH 651	Designing Supportive Environments
IDH 710	Housing and Facility Management[2]
IDH 725	Community Housing Needs[2]
IAR 730	Facility Management[2]
KIN 796	Topics in Physical Education[1]
PLAN 715	Planning Principles[2]
PLAN 761	Community Development Workshop[2]
SOCIO 744	Social Gerontology
THTRE 665	Drama Therapy for Special Populations[2]

Graduate credit

FN 817	Nutrition and Aging
FSHS 845	Adult Development and Aging
FSHS 894	Readings in Human Development and Family Studies
SOCIO 944	Seminar in the Sociology of Aging

[1]Center for Aging approval required for gerontology credit
[2]Project approval from Center for Aging required

Gerontology courses

Undergraduate and graduate credit
GERON 600. Seminar in Gerontology. (3) II. An interdisciplinary course organized topically, with students presenting papers on aging-related issues that draw upon the students' previous and concurrent academic experience. Provides supervised independent study and subsequent discussion, allowing students to integrate and order their perceptions about gerontological issues. Pr: Completion of 15 hours of course work in gerontology.

GERON 610. Seminar in Long-Term Care Administration. (3). (Offered January Intersession only). Administration principles involved in the planning, organizing, and directing of long-term care agencies. Includes in-depth exposure to federal and state standards and regulations governing long-term care.

GERON 615/DHE 615. Long-Term Care Administration Internship. (6). Includes: (a) field experience in the general administration of long-term care programs and/or facilities; planning, budgeting, program management, and service delivery; (b) exposure to federal and state standards and regulations governing long-term care; and (c) professional leadership development. Pr: Junior standing, 15 hours of gerontology, MANGT 420, ACCTG 231, GERON 610, and GPA of 2.5 or above (3.0 or above in long-term care administration course work).

GERON 620. Problems in Gerontology. (1–3). Independent study of selected problems. Pr: Background of courses required for problem undertaken and consent of instructor.

For more information

Center for Aging
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Grain Science and Industry

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Katherine Tilley, Ph.D., Kansas State University.
Chuck Walker, Ph.D., North Dakota State University.
David Wetzel, Ph.D., Kansas State University.

Programs

The Department of Grain Science and Industry offers courses of study leading to degrees of master of science and doctor of philosophy in grain science. Grain science faculty collaborate with the scientists at the USDA Grain Marketing Research Laboratories and the American Institute of Baking and there are graduate programs that are collaborative with those laboratories.

Modern teaching and research facilities include a pilot flour mill, feed mill, bakery, extrusion laboratory, and grain storage and handling facility. In addition, more than 10 cereal chemistry laboratories are equipped with ultracentrifuges, freeze-dryers, gas chromatographs, liquid chromatographs, balances, rapid viscosity analyzer, differential scanning calorimeter, thermo-mechanical analyzer, classical rheometer (Instron), dynamic rheometers, gel electrophoresis apparatus, a full array of glassware, rapid analyzers for nitrogen, fiber, and glucose, as well as recording mixers and starch viscometers.

The department has an 86-year history of academic interest in the milling industry with particular emphasis on milling and baking properties of wheat cultivars. The wheat milling facilities range from a bench-scale mill (batch of 0.5 kg of grain) to a pilot mill with a capacity of 6 MT/8h. Specialty dry mills also are available to purify, fractionate, and grind any seed-like material, including all cereals, legumes, pulses, spices, and gums. Plans for a wet-milling laboratory for grain are progressing.

Another unique feature of the department is its fully functional pilot feed mill for research and development studies by university, industry, and government organizations. The feed mill at Kansas State University is a modern concrete and steel structure on campus which houses the latest in equipment in the feed milling industry. Its capabilities include cleaning and receiving raw materials, classification of raw materials, grinding and pelleting, flaking, or extruding. A premix room for micro-ingredients and a large-scale batching system facilitate accurate proportioning and weighing of feed ingredients. The feed mill is capable of producing nearly all physical forms of formulated animal feeds. Plans for construction of new facilities are in progress.

The Extrusion Processing Center, which is constructed for food-grade work, houses a Wenger Model X-20 single-screw extruder, a Wenger Model TX-52 twin-screw extruder, and a gas-fired belt dryer. Departmental facilities for research include well-equipped laboratories for all areas of research in cereal chemistry. This includes laboratories equipped for chemical research and special laboratories equipped for studies of the physical properties of flour, doughs and food systems. Pilot bakery facilities provide an excellent environment for teaching and research. A fully-equipped computer laboratory is available to all students.

The Swanson Memorial Resource Room, located in Shellenberger Hall, contains a collection of volumes relevant to the grain science discipline.

Admission

Correspondence and questions regarding Graduate School are handled by the chair of the graduate admissions committee. You should write to the department requesting information and application forms. Complete the forms when received, obtain the necessary transcripts and request letters of recommendation be sent to the chair of the graduate admissions committee. Applicants should have a B average or better and have completed courses in calculus, physics, organic and biological chemistry and biological science. All applicants whose native language is not English are required to attain a minimum score of 550 on the Test of English as a Foreign Language (TOEFL) before they are admitted to the Graduate School at Kansas State University. The completed application will be evaluated by the department's graduate admissions committee, which will provide a recommendation for action. Files will also be directed to faculty with interest and research activity in the applicant's field of specialization.

No student is admitted and then assigned to a faculty member for supervision. Rather, the faculty member evaluates the application information presented and decides whether or not to supervise the student (i.e., become the student's major professor). Once this agreement has been made, the application is submitted with the committee recommendation to the department head for approval and then forwarded to the Graduate School. The Graduate School has the ultimate authority of approving or denying graduate admission.

Assistantships

Graduate research assistantships in grain science and industry are designed to support the research project areas of the individual faculty members. Those projects may be Kansas Agricultural Experiment Station projects directed by the faculty member or sponsored research projects funded by industrial, state, or federal agencies. In all cases, the decisions regarding support and awarding of assistantships are made on a competitive basis. Funds are not always adequate to award assistantships to all students who would like support. Decisions regarding initial and continuing support are based on both academic performance and research progress. Failure to maintain high quality academic work or research activity can be reason to cancel or discontinue an assistantship. More information about assistantships may be found at our department web site.

Master of science

General requirements

Except under special conditions, candidates for the master's degree are required to spend one academic year in residence.

A committee of at least three graduate faculty members supervises the program of study for the master's degree. The candidate's major professor serves as committee chair. The committee is selected by the student and his or her major professor, with selection of the committee subject to approval by the Graduate School. The supervisory committee's responsibilities include approval of a thesis research proposal, guidance in and approval of a written plan of study which describes course work to be completed, approval of the final copy of the thesis, and administration of a final oral examination.

A master's degree requires a minimum of 30 semester hours of graduate credit including 6 to 8 research credit hours resulting in a thesis.

The student must submit a written plan of study to the Graduate School prior to the end of the second semester that the candidate is enrolled at Kansas State University.

A candidate will submit the thesis to all committee members before the examination is scheduled. A copy is to be available at the final oral examination.

A final oral examination is required of all students. This must include a defense of the thesis in the grain science department, and may include interpretation of other scholarly work, and testing of the students' understanding of their fields of study.

Doctor of philosophy

The Ph.D. degree normally requires three years beyond the master's degree. It is awarded to candidates who have demonstrated unique ability as scholars and researchers and proficiency in communication. The degree also certifies that the candidate has an understanding of the subject matter in the discipline and possesses the ability to make original contributions to knowledge.

General requirements

Graduate study beyond the bachelor's degree equivalent to 90 or more semester hours is required for the doctor of philosophy degree. Those hours include enrollment in at least 30 hours of research and 30 hours earned previously for the master's degree. At least a year in residence at the university is required. The student and major professor select an advisory committee. Selection of the committee is subject to approval by the Graduate School. The committee consists of the major professor and at least three other members of the graduate faculty. One member of the committee must be a member of the graduate faculty in a department other than that of the major professor.

The duties of the supervisory committee include advising the student on preparation of a plan of study and development of a doctoral research proposal, administration of a preliminary written examination, approval of the final form of the dissertation, and administration of the final oral examination. It is expected that each graduate student's dissertation or thesis will be published in the scientific literature. Graduate students are expected to prepare draft manuscripts prior to or by the time of their final oral exam. Publication of some items can precede publication of thesis or dissertation but guidance regarding prior publication should be followed.

Course work

Grain science includes the science and technology of cereals and other grains, their basic properties and their utilization in foods, feeds, and other industrial products. Knowledge of chemical, biological, physical, and mathematical sciences is fundamental to grain scientists. As part of their degree programs, students will develop strong written and oral communication skills.

The course requirements for each graduate student in grain science will be drawn from the fields listed above. Specific requirements for each individual will be determined by the major professor and the supervising committee, with due consideration given the student's qualifications and professional plans and interests. Students may be required to make up deficiencies in course work in their undergraduate curriculums.

Suggested courses for the M.S. degree

All students:

GRSC 815	Fundamentals of Grain Processing
GRSC 602	Cereal Science
GRSC 900	Graduate Seminar in Grain Science

A graduate-level grain science course in at least one specialty area (i.e., baking, milling, feed science)

STAT 703, STAT 704, and STAT 705	Statistics
BIOCH 755	Biochemistry
	or
BIOCH 521	General Biochemistry
BIOCH 756	Biochemistry Lab is also suggested

Additional suggested courses for the Ph.D. degree

All students:

STAT 720	Design of Experiments
GRSC 900	Graduate Seminar in Grain Science
BIOCH 755	Biochemistry 1 for those in cereal science programs
GRSC 900	Graduate Seminar in Grain Science

Cereal science programs

10 credit hours of chemistry and/or physics, including an advanced course in biochemistry and an acceptable course in physical chemistry which has calculus as a prerequisite.

Grain science courses

Students without the prerequisite must have the permission of the instructor.

Undergraduate and graduate credit in minor field

GRSC 500. Milling Science I. (4) II. Principles and practices of wheat flour milling with full-scale equipment including grain storage, blending, cleaning, conditioning plant, and a modern pneumatic 240 hundred weight flour mill, with instrumentation and air conditioning, etc. Two hours lec. and six hours lab a week. Pr.: GRSC 100 and 110.

GRSC 505. Cereal and Feed Analysis. (3) II. Principles and methods of analyzing and testing cereal grains, cereal, and feed products. One hour lec. and six hours lab a week. Pr.: CHM 230 and BIOCH 120.

GRSC 510. Feed Technology I. (4) I. Introduction to the engineering of formula feed manufacture, including principles of conveying, grinding, mixing, pelleting, and the formulation of concentrates, premixes, and rations using a digital computer. Three hours lec. and three hours lab a week. Pr.: ASI 318 and GRSC 110.

GRSC 591. Commercial Feed and Food Manufacturing Internship. (2) I. A practical application of feed and food manufacturing technology during an eight-week summer internship with an active commercial feed and food manufacturing company. The course will stress applied aspects of commercial feed and food manufacturing, which can include, but not be limited to, plant operations, maintenance, personnel and labor relations, business management, warehousing, ingredient procurement, quality assurance, and fleet management. Pr.: GRSC 510 or 635.

Undergraduate and graduate credit

GRSC 602. Cereal Science. (3) I, II. The characteristics of cereals, legumes, their components and their processing to foods. Three hours lec. a week. Pr.: BIOCH 265.

GRSC 610. Electricity and Its Control for the Grain Processing Industry. (3) II. Major emphasis will be given to application of electricity to machinery for grain processing and electrical code. Two hour lec., two hour lab. Pr.: Either GRSC 500, 635, or consent of instructor.

GRSC 625. Flour and Dough Testing. (3) I, II. Physical and chemical methods used in evaluating wheat flour and doughs. Two one-hour lectures and one-three lab a week. Pr.: GRSC 602.

GRSC 630. Management Applications in the Grain Processing Industries. (3) II. This course deals with management principles and their specific application to the processing industries. Industry and allied trade personnel in management positions will give a number of lectures in their field of expertise. Special emphasis is placed on grain industry organizations, labor contracts, supervision, scheduling and planning, regulatory agencies and cost control. Three hours lec. a week, Pr.: ECON 110 and either GRSC 510, 500, or consent of instructor. Junior standing.

GRSC 635. Baking Science I. (2) I. Introduction to properties of ingredients used in baking, reactions of ingredients during processing into baked products. Two hours lec. a week. Pr.: BIOCH 120.

GRSC 636. Baking Science I Laboratory. (2) I, II. Laboratory exercises in theory and production of yeast-leavened baked products. Six hours lab a week. Pr.: 635 or conc. enrollment.

GRSC 640. Advanced Flow Sheets. (2) II. Design of flow diagrams for dry milling processes. Uses a combination of methods that lead to practical applications and analytical techniques. Six hours lab a week. Pr.: GRSC 500 or 510.

GRSC 651. Food and Feed Product Production. (4) II. Sanitation in relation to processing, handling, and storage of human and animal foods. Emphasis on contaminants, control of causative agents, equipment and plant design, applicable laws and regulations. Three hours lec. and three hours lab a week. Pr.: Minimum of eight hours of biological science and junior standing.

GRSC 655. Cereal Food Plant Design and Construction. (3) I. Drawing assignments relative to the building, or modification, of cereal mills. Pr.: GRSC 500 or 510.

GRSC 661. Qualities of Food and Feed Ingredients. (3) I. The course provides an integrated biological, chemical, and physical basis for evaluating the inherent nutritional quality of food and feed ingredients and the scientific literature techniques for obtaining new information. Three hours of lecture a week. Pr.: BIOCH 120.

GRSC 670. Bakery Layout. (1) I. The layouts of facilities to produce baked goods are studied. Students prepare their own bakery layout. Current problems in a bakery production setting in the baking industry are discussed. Two hour lab. Pr.: PHYS 113, and GRSC 636.

GRSC 701. Practicum in Bakery Technology. (1). One week intensive course during the January Intersession. Lectures and hands-on laboratory experience with commercial production scale baking equipment for breads and rolls, cookies and crackers, and cakes and sweet doughs. Restricted to upperclass bakery science and management majors or permission of the instructor. Pr.: GRSC 635, 636.

GRSC 710. Fundamentals of Grain Storage. (2) I. Study of the theory and practice of management of stored grain to maintain grain quality and maximize profits. Subjects include grain quality factors, physical properties of grain, grain masses, and grain storage structures, causes and management of deterioration in grain quality, and regulatory issues related to grain handling and storage. Pr.: GRSC 602 or 661.

GRSC 712. Vibrational Spectroscopic Analysis and Chemometrics. (1–2) II. Infrared and particularly modern near-infrared spectroscopic "as is" analysis of foods, natural products, and synthetic substances is accomplished with direct sampling and the use of multivariate statistics. This course is intended to enable the student to understand the principles and successfully apply this technology to practical analytical problems with emphasis upon food. Method development will be taught using specific analytes in selected products. Theoretical background, working of modern instrumentation and associated software is presented in support of achieving practical competence. Pr.: BIOCH 265, or CHM 271 or consent of instructor.

GRSC 713. Contemporary Chromatographic Analysis of Food. (1) II. High performance liquid chromatography (HPLC) is the primary focus of this course. This will be supported by including treatment of topics in contemporary gas chromatography and supercritical fluid chromatography and extraction. Optimizing chromatographic conditions through knowledge of the column chemistry will be covered in addition to detector options, instrumentation, and sample preparation. Pr.: BIOCH 265, or CHM 271 or consent of instructor.

GRSC 720. Extrusion Processing in the Food and Feed Industries. (4) II. The course is designed to provide the student with an understanding of extrusion technology and the ability to apply it to product development and production through a "hands-on" approach. Major emphasis is on laboratory exercises in which students will operate pilot scale extrusion equipment to produce readily-recognizable commercial products such as cheese curls, breakfast cereals, pasta, pet food, etc. Emphasis will also be placed on process and product development, analysis, and problem solving techniques. Three hours lec. plus one three-hour lab a week. Pr.: STAT 320 and GRSC 602.

GRSC 725. Feed Manufacturing Processes. (3) II. Study of the technical phases of formula feed manufacturing, equipment design and function, effect of processing and ingredients on nutritional acceptability of feeds and quality control. Two hours lec. and three hours lab a week. Pr.: MATH 100, 150, and ASI 318.

GRSC 730. Milling Science II. (2) I. Advanced study of the entire gradual reduction system of wheat flour milling and the many unit process systems that constitute the milling system. The theory and practice of mill control are studied in detail. Processing of other cereal grains and oil seeds are covered as well as general mill management. Two hours of lecture a week. Pr.: GRSC 500.

GRSC 731. Milling Science II Laboratory. (2) I. Advanced studies of the gradual reduction milling system as well as the milling processes for the various other classes of wheat and other cereal grains. The basic design of some equipment is also included. Six hours lab a week. Pr.: GRSC 730 or conc. enrollment.

GRSC 734. Milling Processing Technology Management. (3) II. A capstone course for grain science and industry students. The objective is to familiarize students with the structure of the U.S. flour milling industry, the managerial and processing operations involved in the management of a flour mill, modeling simulation techniques for flour milling operations and investment projects and evaluation of new milling technologies. Two hours lec. and three hours of lab per week. Pr.: GRSC 730.

GRSC 737. Baking Science II. (2) II. Study of physical, chemical, and functional properties of ingredients used in production of bakery products including cakes, cookies, doughnuts, pies, bagels and related products. Principles of chemical leavening. Description of processes utilized to make the various bakery foods. Chemistry and functionality of flavors, spices, gums, speciality starches and colors used in baking. Types of fillings and icings for bakery products. Formulation of low fat and low calorie baked products. Quality factors, total quality programs and nutritional value of end products. Two hours of lecture a week. Pr.: GRSC 635.

GRSC 738. Baking Science II Laboratory. (1) II. A laboratory course to accompany Baking Science II (GRSC 737). Exercises and experiments in production of chemically-leavened and yeast-leavened bakery foods including various cakes, cookies, doughnuts, bagels, icings, and fillings. Three hours of lab a week. Pr.: GRSC 737 or concurrent enrollment.

GRSC 750. Feed Technology II. (4) I. Advanced study of engineering principles applicable to flour and feed plant operations, materials handling, equipment selection, and processing systems. Three hours of lecture per week and three hours of laboratory per week. Separate laboratory sessions are conducted for flour and for feed students. Pr.: GRSC 510 or 500, PHYS 114 or 214, and a course in statistics and computer use.

GRSC 751. Air Handling in Grain Processing. (3) II. Emphasis is given to pneumatic conveying, exhaust systems, and air handling in the grain processing industry. Two hours lec. and three hours lab a week. Pr.: MATH 210 and PHYS 213.

GRSC 785. Advanced Flour and Feed Technology. (3) II. Design and use of exhaust systems, pneumatic conveying systems, bins and hoppers, and the practical applications of electrical interlocking, instrumentation, and microprocessors to automatic mill control. Also other subjects such as sound measurement and explosion detection and prevention are covered. Two hours lec. and three hours lab a week. Pr.: GRSC 730 or 750.

GRSC 790. Grain Science Problem. (Var.) I, II, S. Pr.: Consent of staff.

Graduate credit

GRSC 805. Nutritional Properties of Cereals and Legumes. (3) II. Special emphasis is given to the nutritional properties of grains and legumes and their processed products. Pr.: BIOCH 521, GRSC 602, or conc. enrollment.

GRSC 811. Principles of Food Analysis. (3) II. Principles of instrumentation and analysis, with emphasis on applications to quality control and research in the food industry. Pr.: CHM 271 or GRSC 505 and BIOCH 120.

GRSC 815. Fundamentals of Processing Grains for Food. (3) I. Unit processes in the receiving and storing of grains; grinding, sifting, mixing, conveying, cooling, drying air qualities, air flow, compaction, extrusion, etc. This course is not open to undergraduate majors in the department. Two hours lec. and three hours lab a week. Pr.: PHYS 114.

GRSC 820. Advanced Extrusion Processing. (4) Advanced study of engineering principles of extrusion forming and cooking with a detailed focus on scale-up. A variety of extrusion systems will be studies in lab with associated roup projects. Three hours lec. and three hours lab a week. Pr.: GRSC 720.

GRSC 825. Novel Uses of Biopolymers. (2) I. Teach existing value-added technology of cereal polymers, and explore new processes and utilization in non-traditional food/feed and in non-food/feed. Two hours lec. a week. Pr.: BIOCH 521 and PHYS 115.

GRSC 830. Physical Properties of Cereal Polymers. (3) II, even years. Physical properties of cereal polymers include physical attributes, rheological, mechanical, thermal, electrical, and optical properties. Thermal analysis methods will be taught. Thermal analysis include glass transition, gelatinization, denaturation, and thermal softening and settings of cereal polymers. Rheological properties associated with these thermal transitions will be discussed. Applications of thermal analysis in cereal chemistry, processing, and product quality control will be discussed. Two hours lecture and discussion, and two hour lab. Pr.: GRSC 602.

GRSC 840. Advanced Grain Processing Technology. (3) II. An overview of unit operations used in the grain/food processing industry will be given. Specific applications of the unit operations will be covered in detail for dry and wet milling (wheat/corn/sorghum), masa manufacturing, oilseed processing, rice milling, and packaging systems. A term project, which will include an applied research component will be developed by each student. Three hours of lecture a week. Pr.: Graduate student standing.

GRSC 880. Advanced Processing Series: Breakfast Cereal Technology. (3) I, in odd years. The breakfast cereal industry, from product development to production to marketing, with emphasis upon biochemical factors during processing this class of cereal grain based foods. Chemical and physical changes during processing and shelf life will be covered, including protein, starch, and lipid changes. Two hours of lecture and 1 activity session per week. Pr.: GRSC 602.

GRSC 885. Advanced Processing Series: Pasta and Noodle Technology. (3) I, in even years. The alimentary pasta industry, from product development to production to marketing, with emphasis upon the changes occurring to the starch, protein, and lipids during processing of these cereal grain based foods. The unit operations involved in converting raw materials to product on the shelf will be covered, including milling, blending, forming, and drying, as well as instant pasta and noodle technology. Two hours of lecture and 1 activity session per week. Pr.: GRSC 602.

GRSC 899. Research in Grain Science. (Var.) I, II, S. Research may be used as basis for the M.S. thesis. Pr.: Consent of staff.

GRSC 900. Graduate Seminar in Grain Science. (1) I, II. Discussion of technical problems in the cereal industry. One hour lec. a week. Attendance required of all graduate students in grain science.

GRSC 901. Starch Chemistry and Technology. (2) II, in even years. Chemical and physical properties of cereal and legume starches. Isolation, structure, assay methods, and properties in solution. Methods of modifying starches for industrial use, including chemical, physical, and enzymic modification. Pr.: BIOCH 521, GRSC 602.

GRSC 905. Enzyme Applications. (2) I. Theories of enzyme action and function; commercial methods of manufacture and industrial uses, with special emphasis on the role of enzymes in the food industries. Two hours lec. a week. Pr.: BIOCH 521 and 522.

GRSC 910. Topics in Grain Science. (Var.) I, II, S. Discussions and lectures on important areas and contributions in the field of grain science not currently covered in present courses. Pr.: Consent of instructor.

GRSC 915. Advanced Cereal Chemistry. (3) II. The chemistry of cereal components at the molecular level. The role and interactions of the various constituents, their functionality in producing an end product, and their influence on nutritional properties. Three hours lec. a week. Pr.: BIOCH 521 and 522.

GRSC 999. Research in Grain Science. (Var.) I, II, S. Research may be used as basis for Ph.D. dissertation. Pr.: Consent of staff.

For more information

For additional information and application materials please contact:
Director of Graduate Studies
Kansas State University
Department of Grain Science and Industry
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Robin Higham, Ph.D., Harvard University.

Jack M. Holl, Ph.D., Cornell University.

Peter B. Knupfer, Ph.D., University of Wisconsin-Madison.

George M. Kren, Ph.D., University of Wisconsin–Madison.

Robert D. Linder, Ph.D., University of Iowa.

Bonnie Lynn-Sherow, Ph.D., Northwestern.

John M. McCulloh, Ph.D., University of California–Berkeley.

Donald J. Mrozek, Ph.D., Rutgers University.

Mark P. Parillo, Ph.D., Ohio State University.

Michael A. Ramsay, Ph.D., Queen's University.

James E. Sherow, Ph.D., University of Colorado.

David Stone, Ph.D., Yale University.

Lou Falkner Williams, Ph.D., University of Florida.

Sue Zschoche, Ph.D., University of Kansas.

Overview

The Department of History offers well-prepared students an exceptional opportunity to work closely with an unusually productive and well regarded faculty. The department aims to help students find and develop their talents fully and to establish themselves as independent scholars, teachers, and other historical professionals.

The department offers programs of study leading to the master of arts and doctor of philosophy degrees in selected traditional and innovative fields. In addition to various American and European fields and modern South Asia, the department's strengths include areas such as social and cultural history, religious history, history of sport, the American West, and twentieth-century United States history. An area of particular emphasis at Kansas State University is military history.

The university's Farrell Library has a number of large, specialized collections. In addition, nearby are several excellent research facilities: the Eisenhower Presidential Library in Abilene, with outstanding holdings relating to the Eisenhower administration and recent military history; the Kansas State Historical Archives in Topeka; the Truman Presidential Library in Independence, Missouri, with valuable collections on the Truman administration, the history of the American presidency, and foreign policy; the Linda Hall Library, in Kansas City, Missouri, emphasizing materials pertaining to science and the history of science; and the regional Federal Records Center in Kansas City, currently rich in military and civilian records and eventually to have a microfilm duplication of the main holdings of the National Archives in Washington.

The history department encourages its students to engage in broad professional activities. Many students publish in historical journals, present papers at conferences, and speak to off-campus groups while completing their degrees. The history department also has an active internship program. Graduate students can gain valuable "hands-on" experience in institutions such as the Riley County Historical Museum, the Fort Riley Cavalry Museum, the Kansas State Historical Society, and the Dwight D. Eisenhower Library. Graduate degrees in history have traditionally led to positions in higher education, and students earning the Ph.D. at Kansas State University have effective preparation for careers as teachers and scholars. But a high percentage of history graduate degree holders also enter archival or museum work, historical publishing, governmental official history programs, historical research for private businesses, and professional service as military officers. The history faculty regards such nontraditional careers as legitimate first choices for its students and works with the students to define programs that accommodate these varied objectives.

Degrees

The master of arts requires a minimum of 30 hours beyond the baccalaureate degree, and the program offers three options: 24 hours of course work plus a thesis (6 research hours); 28 hours of course work plus a report (2 research hours); or 30 hours of course work. All candidates for the M.A. must take a course in historiography. Those who write a thesis or report must take two seminars or topics courses and pass an oral or written final examination that centers on the student's research. Those who take the nonthesis, nonreport degree must take three seminars or topics courses and pass a written final examination over their coursework.

The doctor of philosophy requires completing 30 hours of course work beyond the master's, satisfying the language requirement, passing the qualifying examination, and writing a sound dissertation based on original historical research that is approved by the student's committee. The qualifying examination includes separate examinations in a geographically and chronologically defined general field (medieval, early modern, or modern Europe; United States; or modern South Asia) and three special fields, one of which must offer a mode of understanding that is significantly different from the dissertation field or be from outside history.

To satisfy the language requirement for the Ph.D., the student must demonstrate either a reading, writing, and speaking knowledge of one foreign language at the "intermediate-mid" level or a reading knowledge of one foreign language at the "advanced-plus" level as these terms are defined by the American Council of Teachers of Foreign Language provisional guide lines. New doctoral students entering the program with a master's degree from another university will demonstrate their progress in the acquisition of language competency by passing or by providing proof of passage of a reading knowledge examination at the "intermediate-mid" level within one year after having begun their Ph.D. work. Students who receive their master's in history from Kansas State University must satisfy this requirement for reading knowledge before they may take courses toward a doctorate.

Admission

Applicants to graduate programs at Kansas State University must submit an application for admission and provide official copies of transcripts of record from each college or university attended. In addition all applicants to the programs in history must complete a statement of purpose and a supplementary information form and provide three letters of academic reference. Applicants should also submit scores from the Graduate Record Examination general test (the advanced test in history is not required) or the Miller Analogies Test.

International students must provide evidence of financial support as required by the Graduate School, and those whose native language is not English must present a score of 600 or better on the Test of English as Foreign Language for admission.

Financial support

Outstanding graduate students in history qualify for fellowships granted by the Graduate School, and some students may be appointed to graduate research assistantships funded by the university or by money from external grants.

The Department of History also offers graduate teaching assistantships to qualified students on a competitive basis. Stipends generally range from $6,200 to $7,200 for nine months. For 1999–2000 the stipend for M.A. students holding GTA positions was about $6,200. The stipend for Ph.D. students holding GTA positions was about $7,200. GTAs also receive a full fee waiver.Beginning GTAs work as graders or discussion leaders, and experienced assistants are frequently assigned independent sections of survey courses. Prospective students wishing to be considered for graduate teaching assistantships must complete their applications for admission by February 1.

Prospective students may apply simultaneously for admission to the graduate program and for a GTA. Anyone wishing to be considered for an assistantship should indicate in the blank provided on the supplementary information form, no additional application form is required.

Continuing students who do not already hold a GTA must write to the department head or the director of graduate studies as the head's representative to apply for an assistantship, and they must present a letter of recommendation from a member of the faculty, who is normally the student's major professor. These applicants are reviewed on the basis of their entire record, which includes all of the materials supplied for admission plus their grades and other evidence of their performance in our program, including the required letter of recommendation.

Students who hold an assistantship and seek to have it renewed for another year are likewise expected to apply for consideration, providing a letter of recommendation from the major professor and, for those who have assisted a faculty member, a letter from the supervising instructor. GTAs seeking renewal of their appointment must also present a copy of an application for a fellowship or grant, which they have filed with some external funding agency.

All applications are reviewed by the graduate admissions and awards committee. The committee considers first the requests for renewal. Master's students may hold an assistantship

for a maximum of two years, doctoral students who have earned a master's degree elsewhere for a maximum of three years, and students who finish an M.A. here and proceed to the Ph.D. program for a maximum total of four years. To merit renewal, the holders of assistantships are expected to demonstrate satisfactory performance of their duties as GTA and satisfactory progress toward their degrees.

History courses

Undergraduate and graduate credit in minor field

HIST 503. Overseas European Studies. (2–3) Intersession only, in alternate years. Selected aspects of European history and culture with reading, lectures, and discussions which will relate historical events to the places visited. Pr.: Sophomore standing.

HIST 504. History of Hinduism. (3) I, in alternate years. Examines one of the world's oldest religions from its origins to the present. Covers the fundamental ideas and practices of Hinduism and the development of related religions such as Buddhism, Jainism, and Sikhism. Pr.: Sophomore standing.

HIST 505. Introduction to the Civilization of South Asia I. (3) In alternate years. Interdisciplinary survey of the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, philosophical and social concepts, social and political institutions, literature and historical movements. Same as ECON 505, POLSC 505, SOCIO 505, ANTH 505.

HIST 506. Introduction to the Civilization of South Asia II. (3) In alternate years. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, language and literature, geography, social and political structure and ideas. Same as ECON 506, POLSC 506, SOCIO 506, ANTH 506.

HIST 508. Introduction to Modern East Asia. (3) In alternate years. The history of China, Japan, and surrounding countries including the arrival of Europeans in the sixteenth century, reactions to Western imperialism, the rise of nationalism, and revolution. The impact of the two world wars, the era of post war developments, communism in China, democracy in Japan, and the end of Western colonialism are also examined. Pr.: Sophomore standing.

HIST 512. Women in European History. (3) I, in alternate years. A study of women in primitive European societies, in preindustrial times, and in the industrial era. Emphasis will be upon the position and role of women within the society. Pr.: Sophomore standing.

HIST 513. Battles and Leaders. (3) I, in alternate years. The course will emphasize military organization, tactics and strategy, generalship and grand strategy, manpower and logistics, and the wartime ramifications of war on land, at sea, and in the air. Pr.: Sophomore standing.

HIST 514. World War II. (3) I, in alternate years. Origins, conduct, and consequence of World War II. Films from the TV series "The World at War" form an integral part of the course. Pr.: Sophomore standing.

HIST 515. History of Sport. (3) In alternate years. The historical development of sport (especially in Europe and North America) including the growth of competition, the rise of mass spectator sports, elitism, and the changing function of sport. History of sport as business and history of the relationship between sport and other institutions. Same as PE 515. Pr.: Sophomore standing.

HIST 516. History of Science I. (3) I, in alternate years. Scientific activity and thought from antiquity to the end of the sixteenth century, with emphasis on Greek, late medieval, and Renaissance science. No background in science required. Pr.: Sophomore standing.

HIST 517. History of Science II. (3) II, in alternate years. Science in the seventeenth and eighteenth centuries, with emphasis on Galileo, Newton, philosophies of science, scientific societies, and developments in the physical, biological, and earth sciences, including the relations of science with technology, medicine, religion, exploration, and the enlightenment. No background in science required. Pr.: Sophomore standing.

HIST 518. Science in the Modern Age. (3) I, in alternate years. Science since the eighteenth century, including major developments in the physical, biological, and earth sciences, and the relations of science to scientific societies, technology, medicine, exploration, religion, and archaeology. No background in science required. Pr.: Sophomore standing.

HIST 519. Science in America. (3) I, in alternate years. A survey of American science from the colonial era to the present, with special attention to the historical context and the role of institutions and government. Some attention to the social problems faced by scientists and their responses to them. Pr.: Sophomore standing.

HIST 520. Death and Dying in History. (3) I, II, in alternate years. Examines European and American attitudes toward death and dying in various historical periods. Topics include: death and dying in the European Middle Ages and in nineteenth and twentieth century America, the impact of the Nazi Holocaust on modern opinions about death, suicide as a historical problem, the fear of cancer in modern times, and others. Pr.: Sophomore standing.

HIST 521. History of Christianity. (3) I, in alternate years. A history of the Christian religion from the era of Jesus Christ to the present with special emphasis on people and ideas. Pr.: Sophomore standing.

HIST 522. Religion in American History. (3) II, in alternate years. A study of the impact of religion on American culture and of American culture on religion, the Social Gospel and related issues, and the interrelationship of Christianity and politics. Pr.: Sophomore standing.

HIST 523. A History of the Occult and Witchcraft. (3) In alternate years. A study of the history of the occult and witchcraft in Western civilization with special attention to religious, intellectual, and social issues and influences. Pr.: Sophomore standing.

HIST 524. The History of Baseball in American Culture. (3) In alternate years. The history of baseball from its origins in the early nineteenth century to the present, with emphasis on the major leagues and their collateral organizations but also with attention to semi-pro and amateur baseball and to the old Negro Leagues. The history of the game will be examined in the context of American history with special reference to social issues, politics, religion, literature, music, and the medial. Pr.: Sophomore standing.

HIST 525. Colonial America. (3) In alternate years. About 1450 to 1763. Includes the European background of North American colonization, the rivalry for new world empire, seventeenth century English colonial foundations, and development of the various colonial societies. Pr.: Sophomore standing.

HIST 526. The American Revolution. (3) In alternate years. Eighteenth century colonial background of the Revolution and the revolutionary era itself, 1763–1789. Stresses ideological and other causes of the Revolution, the course of the war, its social results, the Confederation and its demise. Pr.: Sophomore standing.

HIST 527. The Early National Period. (3) In alternate years. Foundations of the new nation from the adoption of the Constitution to the conclusion of the War of 1812, approximately 1789–1815. Stresses the contest between Hamiltonians and Jeffersonians for philosophical dominance of institutions; other topics include diplomacy, westward expansion, military developments, the social and intellectual life of the era. Pr.: Sophomore standing.

HIST 529. Civil War and Reconstruction. (3) I, in alternate years. 1848–1877. Examination of the sectional controversy, the failure of the political system to resolve peacefully the conflict between North and South, the resort to arms, the nature of the post-war settlement. Emphasis is on the attempt of mid-nineteenth-century American leaders to deal with the complex problems of slavery and race. Pr.: Sophomore standing.

HIST 531. The United States in the Twentieth Century. (3) In alternate years. Examines the creation of modern America, 1890 to the present. Emphasis on the social and cultural roots, and political consequences, of Progressivism, World War I, the Great Depression, World War II, the Sixties, and Post-Vietnam America. Pr.: Sophomore standing.

HIST 533. Topics in the History of the Americas. (1–3) In alternate years. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in the history of North, Central, or South America. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

HIST 536. The American West. (3) I, in alternate years. Primary emphasis on the nineteenth century when Americans were rapidly spreading across the continent. Also examines the earlier developments of the frontier and considers the twentieth century role of the trans-Mississippi region. Pr.: Sophomore standing.

HIST 537. History of the Indians of North America. (3) In alternate years. A discussion of Indian-white relations from 1492 to the present. Special emphasis given to federal government policy and the cultural decline of the native people of North America. Also includes an examination of Indian reservations and urban Indians.

HIST 538. The Great Plains. (3) II, in alternate years. Concentration on the one-fifth of North America identified as the Great Plains; the development of that region in historic times. Pr.: Sophomore standing.

HIST 539. African–American History. (3) In alternate years. An overview of the African–American experience from the seventeenth century through the civil rights movement. Emphasizes social, legal, economic, political, and intellectual aspects of black history as well African-American contributions to American life and culture. Pr.: Sophomore standing.

HIST 541. Women in American History. (3) II, in alternate years. An overview of women in the history of the United States, emphasizing both important individual women and the changing position of women in American society. Pr.: Sophomore standing.

HIST 543. The United States and World Affairs, 1776–Present. (3) I, in alternate years. History of U.S. foreign policy since 1776. Stresses the continuity and intellectual foundations of foreign policy. Emphasizes territorial and foreign commercial expansion and America's response to war and revolution in the twentieth century. Pr.: Sophomore standing.

HIST 544. History of U.S.–Soviet Relations Since 1917. (3) II, in alternate years. History of U.S.–Soviet relations since 1917 with emphasis on WWI and the New Diplomacy; from nonrecognition to recognition, 1921–1933; the Grand Alliance and WWII; origins of the cold war; economic and atomic diplomacy; the Cuban missile crisis; and prospects for detente. Pr.: Sophomore standing.

HIST 545. War in the Twentieth Century. (3) In alternate years. Considers the military theory and practice, the technology, and the political and ideological constraints of World Wars I and II, the Spanish Civil War, the Korean War, and the Indo-chinese wars. Students are to gain an understanding of the varieties of military experience in the twentieth century, including civil wars, "total war," and guerrilla warfare. Pr.: Sophomore standing.

HIST 546. History of American Military Affairs. (3) In alternate years. Deals with the development of military institutions in colonial America and the United States, civil-military relations and conflicts between political constraints and strategic demands, popular attitudes toward the military, and the rise of the military-industrial complex. Pr.: Sophomore standing.

HIST 548. American Business History. (3) In alternate years. The rise and development of the major commercial, financial, industrial, and transportation enterprises in the United States from the colonial period to the present. Emphasizes the gradual specialization of business through the Civil War, the movement from specialization to combination and integration along vertical/horizontal lines, the conglomerate movement, and the development of multinational enterprises after World War II. Pr.: Sophomore standing.

HIST 552. Studies in American Social History. (3) In alternate years. Exploration in depth of one specific topic in American social history, such as the impact of immigration, the development of cities, the history of labor and the rise of unions, development of the family, of education, or of medicine. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

HIST 553. History of American Culture. (3) II, in alternate years. Main emphasis is on political, religious, and social thought and ideology, 1620 to present. Pr.: Sophomore standing.

HIST 555. American Constitutional History. (3) II, in alternate years. Survey of constitutional and legal development from colonial times to the present. English constitutional ideas and the common law in the American colonies, formation of the Constitution, the role of the Supreme Court, development of the modern American legal system, growth of the legal profession, the problem of civil liberties. The course offers insight into the relationship of constitutional-legal institutions to American society. Pr.: Sophomore standing.

HIST 557. History of American Agriculture. (3) In alternate years. Concentrates on the period since 1850 in an attempt to acquaint the student with the political and economic history of American agriculture. No attempt will be made to present the scientific or technological side of agriculture in detail, but agriculture will be shown in relation to the life of the entire United States. The life of the farmer and his family, the relationship between agricultural changes and other parts of the economy will be part of this course. Special attention will be paid to agriculture in Kansas and the Great Plains. Pr.: Sophomore standing.

HIST 558. History of Kansas. (3) I, II. Land, people, and cultural developments in Kansas, from the earliest written records to the present. Provides the student with an intimate understanding of the state of Kansas. Pr.: Sophomore standing.

HIST 560. Latin American Nations. (3) In alternate years. Survey of economic, social, and political developments of the Latin American nations from independence to the present decade with emphasis on Argentina, Brazil, Peru, Chile, and Mexico. Stresses reform and revolution of the last 50 years. Pr.: Sophomore standing.

HIST 561. Colonial Hispanic America. (3) In alternate years. Iberian and indigenous American background, exploration, conquest, settlement, and development of Latin America. Stresses growth of mestizo culture, colonial styles of living, and wars of independence. Pr.: Sophomore standing.

HIST 562. Modern Mexico. (3) In alternate years. Brief survey of lines of national development, 1821–1910, and major emphasis on the twentieth-century revolution and its reforms (1910–1940) as well as its subsequent implications. Pr.: Sophomore standing.

HIST 563. Topics in Comparative History. (1–3) In alternate years. Investigation in detail of a particular theme, event, or problem in comparative history. Topics vary. May be repeated once for credit. Pr.: Sophomore standing.

HIST 564. The Russian Revolutions and the Soviet System. (3) In alternate years. Russia's industrial revolution and its deepening crisis to the present. Emphasis on prospects for constitutional monarchy and a liberal parliamentary order from the revolution of 1905 to 1914, World War I and the February Revolution, social democracy and the roots of Leninism, Bolshevizing Soviet society under war, Communism and the NEP, Stalinism: fulfillment or betrayal of Leninism, the Great Patriotic War and the emergence of the Soviet empire, and de-Stalinization: prospects for the Soviet system. Pr.: Junior standing.

HIST 565. History and Culture of Greece. (3) In alternate years. The rise of civilization in the ancient Near East, the migrations of the Greeks and the Heroic Age, the Greek city-states, commerce and colonization, the Persian invasion, Athens' leadership of Greece, the war between Athens and Sparta, Alexander the Great, and the total Hellenic achievement. Pr.: Sophomore standing.

HIST 566. History and Culture of Rome. (3) In alternate years. Examines the various theories of Rome's origin, the causes, problems, and influences upon the republican government, political and economic problems of Roman expansion, and the Roman world. Various reforms including those of the Gracchi, Caesar, and Augustus. Contact with Greece and the older areas of civilization. The Roman imperial system, the many causes of Rome's fall, and Rome's role as a synthesizer of the ancient classical culture. Pr.: Sophomore standing.

HIST 567. Europe in the Middle Ages. (3) In alternate years. Europe from the fall of the Roman Empire to the thirteenth century. Investigates the conflict and interaction of Roman, Christian, and Germanic ideals and attitudes in the early Middle Ages, and the increasing complexity and sophistication of society, culture, religion, and government of the high Middle Ages. Pr.: Sophomore standing.

HIST 568. The Renaissance. (3) In alternate years. The Italian Renaissance as a major phase in the history of Western civilization and its spread to northern Europe. Pr.: Sophomore standing.

HIST 569. The Reformation. (3) In alternate years. A study of the Protestant, Catholic, and Radical Reformations with special attention to Luther, Calvin, the origins of the Church of England and the Presbyterian Church, the Anabaptists, the Puritans, and Roman Catholic Reform, and the impact of religious developments on the political, economic, social, and intellectual history of the Western world. Covers the period from approximately 1500 to 1660. Pr.: Sophomore standing.

HIST 570. Europe in the Seventeenth Century. (3) I, in alternate years. Surveys the economic, social, political and intellectual history of western Europe in the seventeenth century, a period marked by economic depression, international conflict, and domestic revolutions as well as by cultural achievement. Emphasizes the complex interaction among social groups; the rise of a European state system; the development of constitutional monarchy in England and absolute monarchy in France; and the change in values generated by the scientific revolution. Pr.: Sophomore standing.

HIST 571. Revolutionary Europe. (3) In alternate years. Europe from the death of Louis XIV in 1715 to the fall of Napoleon in 1815. The origins and development of the French Revolution and the Napoleonic legacy, also examines reform and counter-revolutionary movements in England, Italy, Russia, Poland, and the Germanies. Pr.: Sophomore standing.

HIST 572. Nineteenth Century Europe. (3) In alternate years. The history of Europe from the French Revolution to the end of the first World War. Major topics covered will include the rise of conservatism as an ideology and its application in practice, the nature of liberalism and socialism, the impact of science and technology, the origins and course of World War I. Pr.: Sophomore standing.

HIST 573. Twentieth Century Europe. (3) In alternate years. Examines the political, social, and intellectual developments of Europe in the period of the two world wars. Emphasis on the failure of democracy and the rise of competing antidemocratic and nondemocratic mass movements and ideologies. The course will also deal with the attempted system of collective security, its failure, and the origins and course of World War II. Pr.: Sophomore standing.

HIST 574. Europe since World War II. (3) In alternate years. Postwar European society, politics, economy, and culture. The effects of total war on the population; restoration and reconstruction. The influence of the U.S. and U.S.S.R. on Europe. Capitalism, socialism, and communism in technological society. European unity movements and their conflicts with traditional values.

HIST 576. European International Relations to 1815. (3) In alternate years. The nature, evolution, and function of the diplomatic system for the Ancient World to 1815. Analyzes the Greek and Roman diplomatic tradition, international relations during the Medieval, Renaissance, and Early Modern periods, and the works of various theorists. Sophomore standing.

HIST 577. European International Relations Since 1815. (3) II, in alternate years. The nature, evolution, and functions of the European diplomatic system from 1815 to the present. Focuses on the Vienna settlement, the Eastern Question, the Crimean War, Italian and German unification, origins of World War I, international developments between the two world wars, the cold war, and the post-cold war era. Includes analysis of major theorists. Sophomore standing.

HIST 578. Central Europe, 1500–1914. (3) In alternate years. The diplomatic, military, political, cultural, and social aspects of the Hapsburg empire in Central Europe from its foundation to its dissolution in the twentieth century. Pr.: Sophomore standing.

HIST 579. The British Isles to 1603. (3) In alternate years. English, Scottish, and Irish culture in the medieval and pre-modern periods. Early folk societies, feudalism, the church in society and politics, the origins of representative institutions and the religious reformations are studied topically. Pr.: Sophomore standing.

HIST 580. The British Isles Since 1603. (3) In alternate years. English society and politics in modern times with reference also to Scotland and Ireland. Emphasis on topics such as the three orders of society (king, lords, and commons), the churches and religion, the appearance of parliamentary sovereignty, the industrial revolution, and the extension of democratic institutions. Pr.: Sophomore standing.

HIST 582. Modern Eastern Europe. (3) In alternate years. Eastern Europe as an ethnically diverse region between the Germanic lands and Russia, emphasizing the impact of both external and internal forces upon the political, socioeconomic, and intellectual development of the various nations. Covers the period from the triumph of the three eastern monarchies over Poland to the Brezhnev Doctrine and Ostpolitik, including the growth of national consciousness and the continuing struggle for political independence. Pr.: Junior standing.

HIST 583. History of France, 1400–1715. (3) In alternate years. France from the conclusion of the Hundred Years War to the death of Louis XIV. French economy, society, and royal administration, and the changes generated in these areas by significant events: the Reformation and the Wars of Religion; the rise of France to world power; peasant uprisings and constitutional crisis; and the reforms of Richelieu, Colbert, and Louis XIV. Trends in art, architecture, and philosophy. Pr.: Sophomore standing.

HIST 584. History of France since 1715. (3) In alternate years. France from the death of Louis XIV to the present. The impact of the French Revolution and the Napoleonic system on the agrarian economy and aristocratic society of the eighteenth century; the evolution of liberalism, socialism, and colonialism; the development of parliamentary democracy and the impact of the Industrial Revolution; the French response to the devastation of World War I, the humiliation of World War II, and the colonial wars of the De Gaulle era. Pr.: Sophomore standing.

HIST 585. Medieval Religion and Politics. (3) In alternate years. The interrelationship of religion and politics from the late Roman Empire to the Conciliar Epoch. Christianity in the Roman Empire and the barbarian kingdoms, the development of royal theocracy, the rise of the papacy, the conflict of church and state, the secularization of government, the Avignon papacy, the Great Schism, and conciliarism. Pr.: Sophomore standing.

HIST 586. Junior Seminar. (3) I, II. An undergraduate seminar that focuses on the intellectual principles of the historical discipline as well as the fundamental research techniques and writing skills used by historians. Each section of the Junior Seminar will center on a particular topic or historical problem. The students will prepare a research paper on a relevant subject of their choice. All history majors must take this seminar to complete the requirements for their degree.

HIST 587. Nineteenth-Century Imperial Germany. (3) In alternate years. Central Europe in the French Revolutionary era, the revolutions of 1848, German unification, imperial Germany, emphasizing social changes, especially the transition from agrarian to industrial society. Pr.: Sophomore standing.

HIST 588. Rise and Fall of Nazi Germany. (3) In alternate years. Examines the political, social, economic, and intellectual developments in Germany from World War I to the end of World War II. The establishment of the Weimar republic, the nature of its democratic system, the flourishing of cultural activities and the attack on democratic theory and practice leading to the establishment of a

totalitarian dictatorship. National Socialism and its leader and alternative interpretations of National Socialism. Pr.: Sophomore standing.

HIST 590. History through Film. (3) I, in alternate years. A study of full-length, major production films to show how films can enhance, distort, or obscure our understanding of the past. Emphasizes historical development, using motion pictures as social documents.

HIST 591. History of Russia to 1801. (3) In alternate years. Medieval and early modern Russia with emphasis on the culture of Kievan Rus', the Mongol Yoke, the rise of Moscow, and the emergence of imperial Russia. Emphasizes those trends that contributed to the character of modern Russian society including Orthodoxy, autocracy, serfdom, and westernization. Pr.: Junior standing or consent of instructor.

HIST 592. Grandeur and Decline of Imperial Russia. (3) In alternate years. Russia in the nineteenth century with emphasis on the political, economic, social, and intellectual development of tsarist society. Topics of special concern: origins of the intelligentsia, plans for political reform under absolutism, serfdom and economic development, the legacy of the Great Reforms and counter reforms, origins and evolution of revolutionary populism. Pr.: Junior standing or consent of instructor.

HIST 593. The Vietnam War. (3) In alternate years. This course examines the origins, actions, and consequences of the Indochina wars fought by the French, Japanese, and Americans during the last century. Particular emphasis is placed on America's experience in Southeast Asia. Videos from the PBS series, "Vietnam: A Television History," are used in the course. Pr.: Sophomore standing.

HIST 596. Holocaust: The Destruction of the European Jews. (3) I, in alternate years. Analysis of the attempts by the National Socialist government of Germany to exterminate the Jewish population of Europe. Major issues discussed will include: nineteenth-century antidemocratic and antisemitic movements; Hitler's concept of antisemitism and personal sources of Hitler's genocidal policy; evolution of the genocidal policy and its implementation; Jewish resistance and collaboration; long-range consequences of the Holocaust. Pr.: Sophomore standing.

HIST 597. Topics in European History. (1–3) In alternate years. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in European history. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

HIST 598. Topics in Non-Western History. (1–3) On sufficient demand. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in non-Western history. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

HIST 599. Senior Seminar for Secondary Teachers. (3) II. Analysis of the historical content of teaching materials currently in use at the secondary level in public schools to determine the historical validity of the materials. Pr.: Sophomore standing.

Undergraduate and graduate credit

HIST 648. Naval History. (3) I or II, in alternate years. Ships, technological developments, navies, tactics, warfare, strategy, and the interrelationship between naval thinking and national and international politics. Pr.: Junior standing or consent of instructor.

HIST 649. Introduction to the History of Aviation. (3) In alternate years. The development of aviation since the Wrights, providing a world view of man's conquest of the air in both human and technological terms including the development of military, commercial, and general aviation. Pr.: Junior standing or consent of instructor.

HIST 650. Internship in History. (3) I, II, S. Practical professional experience involving at least three weeks in an archive, museum, historical library, or business. Student projects must be approved in advance and a report submitted at the end of the work period. May be repeated once for credit. Pr.: Junior standing.

HIST 703. Overseas European Studies. (2–3) Intersession only, in alternate years. Short-term, intensive, and in-depth study of various aspects of European history and culture with readings, lectures, discussions, and on-the-spot experiences which will relate historical events to the places visited. Pr.: Senior or graduate standing.

HIST 798. Readings in History. (1–3) Students will read on a central theme, attend weekly discussions, and write a final report.

HIST 799. Problems in History. (Var.) Intensive study of a particular phase of history. Students will attend weekly discussions and write a major research paper on their findings.

Graduate credit

HIST 801. Historiography. (3–4) Main currents in historical research, the writing of history, and the influence of the great historians from Herodotus to the present. Required of all graduate students in history.

HIST 899. Master's Research in History. (Var.)

HIST 901. Advanced Historiography. (1–4) Advanced work offered on demand and by arrangement, in main currents in historical research, the writing of history, and the influence of great historians.

HIST 903. Renaissance and Reformation Europe. (3) In alternate years. An examination of the major historical problems and literature.

HIST 904. Early Modern Europe. (3) In alternate years. An examination of the major historical problems and literature.

HIST 905. Nineteenth-Century Europe. (3) In alternate years. An examination of the major historical problems and literature.

HIST 906. Twentieth-Century Europe. (3) In alternate years. An examination of the major historical problems and literature.

HIST 907. Colonial/Revolutionary America. (3) In alternate years. An examination of the major historical problems and literature. Pr.: HIST 801 or concurrent enrollment.

HIST 908. Nineteenth-Century America. (3) In alternate years. An examination of the major historical problems and literature. Pr.: HIST 801 or concurrent enrollment.

HIST 909. Twentieth-Century America. (3) In alternate years. An examination of the major historical problems and literature. Pr.: HIST 801 or concurrent enrollment.

HIST 919. Seminar in History of Christianity. (3)

HIST 920. Seminar in American Social History. (3)

HIST 921. Seminar in Latin American History. (3)

HIST 922. Seminar in American Diplomatic History. (3)

HIST 923. Seminar in the History of the American West. (3)

HIST 924. Seminar in Colonial America. (3)

HIST 926. Seminar in American Economic History. (3)

HIST 927. Seminar in American Science and Technology. (3)

HIST 928. Seminar in American History. (3)

HIST 930. Seminar in Modern European History. (3)

HIST 931. Seminar in German History. (3)

HIST 932. Seminar in French History. (3)

HIST 933. Seminar in European Diplomatic History. (3)

HIST 935. Seminar in Modern Russian History. (3)

HIST 936. Seminar in Renaissance and Reformation. (3)

HIST 937. Seminar in British History. (3)

HIST 940. Seminar in Military History. (3)

HIST 950. Seminar in South Asian History. (3)

HIST 979. Seminar in the History of Science. (3)

HIST 980. Topics in European History. (1–3)

HIST 981. Topics in Third World History. (1–3)

HIST 982. Topics in the History of Science. (1-3)

HIST 983. Topics in Military History. (1–3)

HIST 984. Topics in American History. (1–3)

HIST 985. Readings in History. (1–3)

HIST 986. Problems in History. (1–3)

HIST 987. Topics in History of Publishing. (3) A historical introduction and training in the central means by which historical knowledge is transmitted in written format. Pr.: Graduate standing.

HIST 999. Ph.D. Research in History. (Var.)

For more information

For additional information and application materials please contact:
Marsha L. Frey
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For application materials please contact:
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Horticulture, Forestry, and Recreation Resources

Head
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Director of graduate studies
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Alan Erb, Ph.D., University of Maryland.
Jack D. Fry, Ph.D., Colorado State University.
Karen B. Gast, Ph.D., University of New Hampshire.
Wayne A. Geyer, Ph.D., University of Minnesota.
Bingru Huang, Ph.D., Texas Tech University.
Paul H. Jennings, Ph.D., North Carolina State University.
Steven J. Keeley, Ph.D., Colorado State University.
Houchang Khatamian, Ph.D., University of Guelph.
Charles W. Marr, Ph.D., University of Tennessee.
Richard H. Mattson, Ph.D., University of Minnesota.
C. B. Rajashekar, Ph.D., Colorado State University.
Steven C. Wiest, Ph.D., Cornell University.
Kimberly A. Williams, Ph.D., North Carolina State University.

Programs

The Department of Horticulture, Forestry, and Recreation Resources offers graduate programs in horticulture leading to master of science and doctor of philosophy degrees in horticulture. The department has 24 faculty involved in teaching, research, and extension, and maintains a horticulture research facility of 57 acres and a turfgrass research farm of 7 acres near the campus.In addition, the

department operates an 80-acre experimental field in Wichita, an 80-acre pecan experimental field near Chetopa, and a vegetable research field of 10 acres in eastern Kansas near DeSoto. Excellent greenhouse and controlled environmental facilities of nearly 25,000 square feet are available for teaching and research. Research in basic and applied areas of horticulture is supported by modern and well equipped field and laboratory facilities. Research labs support a wide range of studies in the areas of crop production/improvement/adaptation, horticultural therapy, in vitro culture, biotechnology, plant-environment interactions, stress physiology, and molecular biology. The department also participates in an interdepartmental food science program. The department is located on the east wing of Throckmorton Plant Sciences Center with new state-of-the-art research and teaching facilities.

Graduate students participate in activities of the Graduate Club, the American Horticultural Therapy Association, the American Society for Horticultural Science, and Pi Alpha Xi (national honorary in floriculture, landscape and ornamental horticulture).

Degrees

K-State offers master of science and doctor of philosophy degree programs in a diverse number of horticultural commodity and discipline areas. Specializations at masters and doctoral levels include ornamental horticulture, floriculture, turfgrass, vegetable crops, fruit crops, horticultural therapy, and horticultural disciplines including environmental stress physiology, molecular biology, tissue culture, and plant growth regulators.

The graduate faculty participate in training graduate students to excel in research, teaching, and extension activities. Independent and original research is an important part of the graduate program and forms a basis for a graduate thesis. Research can be conducted within the department or in other cooperating departments.

Requirements

Students seeking admission into the horticulture graduate program must have a degree in horticulture, botany, biology, or related agricultural science; those specializing in horticultural therapy may have degrees in horticultural therapy, plant sciences, education, medicine or social/behavioral sciences. All graduate students must have adequate background in horticulture, plant physiology, mathematics, and physical sciences.

The completed application materials should be received by March 15 (international students) or July 1 (U.S. students) for fall admission; September 15 (international students) or November 1 (U.S. students) for spring admission. The application package must contain the following:

(1) Completed application and information form,

(2) A statement of graduate study goals and objectives including the specific area of research interest in horticulture,

(3) Undergraduate and graduate transcripts,

(4) Three letters of recommendation preferably from academic or professional sources,

(5) Recent Graduate Record Exam scores,

(6) Test of English as a Foreign Language scores for students whose native language is not English (minimum acceptable score: 550),

(7) Affidavit of financial support for international students ($18,150), and

(8) An application fee of $25 (U.S. currency) for international students in the form of money order or international cashier's check (no personal checks).

Financial support

A limited number of assistantships are available to qualifying students.The assistantships are awarded based on students academic standing (GPA and GRE scores). The application for assistantships should be made before March 15 along with application materials for fall admission.

Horticulture courses

Undergraduate and graduate credit in minor field

HORT 508. Landscape Maintenance. (3) II. Fundamental principles of maintaining ornamental plantings of trees, shrubs, perennials, and turf in the nursery, home grounds, parks, and similar areas. Three hours rec. a week. Pr.: HORT 374 and 375.

HORT 515. Turfgrass Management. (3) I. Turfgrass identification and adaptation; establishment and maintenance of lawn and recreational turf areas; turfgrass pests and their control. Two hours rec. and two hours lab each week. Pr.: HORT 201 and AGRON 305.

HORT 517. Golf Course Operations. (3) II. Strategies involved in golf course operation, including development of cultural practices, adherence to environment regulations, personnel management, and budgeting. Two hours lec. and two hours lab. a week. Pr.: HORT 515.

HORT 520. Fruit Production. (3) II, in even years. Principles and practices of cultivating fruit and nut crops commercially and in the home grounds. Laboratory offers experiences in pomological practices. Two hours rec. and two hours lab a week. Pr.: HORT 201 or equiv. and HORT 350.

HORT 525. Horticulture for Special Populations. (3) I. An intensive study of the concepts and methods of using plants and gardening as therapeutic activities with developmentally disabled, geriatric, economically and socially disadvantaged, emotionally disturbed, or educationally deprived clients. Two hours rec. and two hours lab a week. Pr.: BIOL 210 or HORT 201.

HORT 530. Horticultural Therapy Case Management. (1) II. Guest lecturer and student presentations of topics relating to professionalism, current issues, or goals of horticultural therapy. The course is intended to help students focus expectations and assumptions about a professional career in horticultural therapy and to give them practice in articulating their understanding of the field. Client case management is used as part of career practice. One hour rec. a week. Pr.: HORT 256 and 525.

HORT 535. Horticultural Therapy Field Techniques. (3) I, II. Students under supervision will plan, conduct, and evaluate horticultural therapy activities at Manhattan institutional sites selected according to student's interest. A weekly discussion session addresses evaluation and issues of professionalism. Two hours rec. and two hours lab a week. Pr.: HORT 525.

HORT 540. Horticultural Therapy Field Experiences. (3 or 6) I, II, S. Supervised training at institutions with horticultural therapy programs to gain experience in the application and use of horticultural activities for special populations. Six months (1,000) hours continuous internships required in psychiatric and correctional programs. Two 3-month (500 hours) internships may be completed at different sites. Students are required to complete 6 credits of field experience before graduation. Pr.: HORT 535.

HORT 551. Landscape Contracting and Construction. (3) II. The use, interpretation, and development of planting plans (including contracting, construction, and specifications) as applied to landscape horticulture. Two hours rec. and two hours lab a week. Pr.: HORT 450.

HORT 560. Vegetable Crop Production. (3) II, in odd years. Study of production principles and cultural practices involved in the growing of vegetable crops. Two hours lec. and two hours lab or field trips a week. Pr.: HORT 201.

HORT 570. Greenhouse Operations Management. (3) I. Greenhouse systems operations and management including greenhouse layout; structures; glazing materials; heating, ventilation, irrigation, lighting, benching, growing medium handling, and fertilization systems; traffic flow; crop handling, processing and shipping. Two hours rec. and two hours lab a week. Pr.: HORT 201.

HORT 575. Nursery and Garden Center Operations. (3) II. A study of the various practices and methods of operating a commercial nursery for the production of ornamental woody plants used for landscaping purposes. Garden center layout, pricing, mark-up, inventory, plant maintenance, and financing will be discussed. Two hours rec. and three hours lab a week. Pr.: BIOL 210, HORT 350 and AGRON 305.

HORT 582. Horticultural Pest Management. (3) II. Strategies involved in horticultural pest management including types, calibration and operation of application equipment, pesticides, legal and safety issues, and non-pesticide control methods. Two hours lec. and three hours lab. a week. Pr.: HORT 201 or BIOL 210, MATH 100, and an entomology, plant pathology, or weed science course.

HORT 585. Arboriculture. (3) I. Principles and practices of maintaining shade and ornamental trees under urban environments. Two hours rec. and three hours lab a week. Pr.: HORT 201 and HORT 374 or FOR 330.

HORT 590. Horticulture Internship. (3 or 6) I, II, S. Principles of commercial or public horticulture activity including exposure to multiple phases of the working horticulture operation. Students will be placed according to specific interest. Required for horticulture majors after having completed 60 hours. Pr.: HORT 201, plus one 500-level horticulture commodity course.

Undergraduate and graduate credit

HORT 625. Floral Crops Production and Handling. (4) II. The principles and commercial practices for producing floral crops emphasizing the physical responses of plants to their environment. Aspects of postharvest physiology are also covered. Three hours lec. and three hours lab a week. One Saturday field trip will be taken. Pr.: BIOL 500, HORT 350 and 570.

HORT 640. Horticultural Problems. (Var.) I, II, S. Problems and reports in floriculture, olericulture, ornamental horticulture, pomology, turfgrass and horticultural therapy. Pr.: Consent of instructor.

HORT 706. Turfgrass Science. (3) II, in even years. Water, temperature, light, soil, and management stresses affecting turfgrass growth; cultural practices that reduce injury. Three hours lec. a week. Pr.: HORT 515.

HORT 725. Postharvest Technology and Physiology of Horticultural Crops. (3) I, in even years. A study of the principles and practices involved in the harvesting, handling and storage of horticultural products. The relationship of plant structure and physiology will be emphasized

in discussing effects of postharvest handling and storage to maximize quality and shelf life of products. Three hours lec. a week. Pr.: One horticulture commodity course and BIOL 500.

HORT 751. Human Issues in Horticultural Therapy. (3) I. New developments and applications of gardening or horticultural activities for special populations will be emphasized. Procedures for management of horticultural therapy programs, designing therapeutic or rehabilitation activities, and evaluation methods will be discussed. Reading of selected research publications relating to horticultural therapy will be assigned. Three hours rec. a week. Pr.: HORT 525 and a course in statistics.

HORT 775. Plant Nutrition and Nutrient Management. (3) II, in even years. Focuses on the macro and micronutrient elements and their function in the growth and development of plants. Emphasis will be placed on the roles of single elements, interactions/balances between elements, and nutrient deficiency/toxicity symptoms as they affect the physiology of the whole plant and management of nutrient applications. The relationships between crop nutrition and production and environmental considerations (yield, drought, temperature, pests) will be explored. This course will utilize instructional technologies which may include electronic chat rooms, satellite video, compressed video, and other technologies. Two hours lec. and two hours discussion a week. Pr.: AGRON 305 and BIOL 500.

HORT 780. Topics in Horticulture. (Var.) I, II, S. Discussion and lectures of important papers and contributions in this field. Pr.: Consent of instructor.

Graduate credit

HORT 800. Horticultural Physiology. (3) II. Discussions of recent advances in horticultural crop plant physiology, including improvements in horticultural crops resulting from applications of molecular biology and biotechnology. Three hours rec. a week. Pr.: BIOL 800.

HORT 846. Plant Research Methods. (3) I. Review of history and forms of plant science literature. Discussion on selecting experimental procedures, interpreting data, and reporting results. Two hours rec. and two hours lab a week. Pr.: One statistics course or consent of instructor.

HORT 898. Master's Report. (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, turfgrass, or horticultural therapy for preparation of master's report. Pr.: Consent of instructor.

HORT 899. Research–M.S. (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, turfgrass, or horticultural therapy for preparation of master's thesis. Pr.: Consent of instructor.

HORT 940. Plant Regulators in Horticulture. (3) I, in even years. A study of synthetic plant regulators used to initiate, induce, promote, inhibit, or alter characteristics of horticultural plants and crops. Included are kinds and types of exogenous plant regulators used on crops, their activity, plant responses, benefits and problems, and application technology. One hour lec. and two hours rec. a week. Pr.: BIOCH 510 or BIOL 500, and one graduate plant commodity course.

HORT 951. Horticulture Graduate Seminar. (1) I, II. Student presentations and discussion of investigational works in the various branches of horticulture.

HORT 960. Environmental Plant Stress. (3) I, in odd years. Physiological, biochemical and morphological factors involved in stress development and resistance will be discussed. Pr.: BIOL 800.

HORT 999. Research in Horticulture, Ph.D. (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, and turfgrass. Data collected may form basis for a thesis or dissertation. Pr.: Consent of instructor.

Forestry courses

Undergraduate and graduate credit in minor field

FOR 510. Urban Forestry. (3) I. A study of the urban forest ecosystem, with an emphasis on its management aspects. The course provides an in-depth study of the theory and practical application of integrated management of the urban forest resource. The following areas will be emphasized: the role environment plays in management, watershed protection, water conservation, and research. Three hours lec. a week. Pr.: BIOL 210 or HORT 201 and either FOR 330 and FOR 340 or HORT 374 and HORT 375.

FOR 520. Urban Forest Administration. (3) II. This course is a study of urban and community forest administration. It considers the urban forest ecosystem involving an in-depth look at ownerships. composition, distribution, benefits, values, and administrative operation. The policies and politics of successful administration will be emphasized. Three hours lec. a week. Pr.: FOR 510.

Undergraduate and graduate credit

FOR 641. Forestry Problems. (1–3) I, II, S. Work is offered in various fields of forestry. Pr.: Consent of instructor.

FOR 643. Agroforestry Systems. (2) II. Study of the woody and non-woody components of the land use management systems used in much of the world. Topics will include international agriculture and forestry covering the interaction of crops, livestock, and woody plants. The agroforestry concept, classification of systems, practices used worldwide, and the contribution of agroforestry to local economies of lesser developed countries will be examined. Two hours lec. a week. Field trip required. Pr.: BIOL 201 or BIOL 210 or HORT 201.

Recreation resources courses

Undergraduate and graduate credit in minor field

RRES 520. Research Methods in Parks and Recreation. (3) I. A study of basic research techniques and the application of specific methodologies in the analyses of recreation and park problems. Three hours lec. per week. Pr.: STAT 330 or 340.

RRES 575. Management of Water Resources for Leisure. (3) II. A study of the management of water resources for leisure time uses. The course investigates the use of rivers, lakes, reservoirs, and marine resources. Management considerations, including agency policy formation, legal rights, use conflicts, and use valuation are covered.

RRES 590. Park Operations and Facilities Management. (4) I. Planning, execution, and supervision of field maintenance, operations, and facilities management to include: job planning, budgeting, equipment selection and maintenance, and personnel practices. Three hours lec. and two hours lab a week. Pr.: Junior standing, RRES 440 and 489.

Undergraduate and graduate credit

RRES 635. Methods of Environmental Interpretation. (3) II. This course focuses on principles and techniques necessary to communicate environmental and cultural values to visitors in park areas. The philosophy, theory, design, and application of interpretive media to communicate information about the environment is studied. Two hours rec. and three hours lab a week. Field trips required. Pr.: FOR 375 and RRES 440.

RRES 640. Advanced Environmental Interpretation. (3) II. This course builds on the principles and interpretive techniques which are introduced in RRES 635. Specifically, labs emphasize development of personal interpretive skills and students are introduced to interpretive media not covered in RRES 635 (e.g., video equipment, computers, etc.). The lecture and readings focus on the philosophy of interpretation and the theoretical framework for designing and evaluating interpretive strategies. One hour lec. and four hours lab a week. Field trips required. Pr.: RRES 635.

RRES 675. Dimensions of Recreational Behavior. (3) II. A case study of the motivational factors and trends affecting recreational visitation patterns, including: attitudes, preferences, and satisfaction measurements. Three hours lec. a week. Pr.: RRES 490.

RRES 699. Parks and Recreation Administration II. (3) II. A focus on personnel management, liability and political issues and funding options for park or recreation agencies. Three hours rec. a week. Field trips required. Pr.: RRES 490.

RRES 705. Parks and Recreation Theory and Policy. (3) I, II. On sufficient demand. An analysis of the values, principles, theories, and processes of public policy development as it applies to the park and recreation profession. Three hours lec. a week. Pr.: RRES 489.

RRES 799. Problems in Parks and Recreation. (Var. 1–3) I, II, S. A special investigation of a problem in parks and recreation normally requiring a combination of experiential work, research, and writing. Pr.: RRES 520 or 590.

For more information

For additional information and application materials please contact:
Dr. C. B. Rajashekar
Director of Graduate Studies
Horticulture, Forestry, and
Recreation Resources
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Hotel, Restaurant, Institution Management and Dietetics

Head

Judy Miller

Director of graduate studies

Carol W. Shanklin

Graduate faculty

Betsy Barrett, Ph.D., Kansas State University.
Carl A. Boger, Jr., Ph.D., Purdue University.
Deborah Canter, Ph.D., University of Tennessee.
Rebecca A. Gould, Ph.D., Texas Woman's University.
Cathy H.C. Hsu, Ph.D., Iowa State University.
Judy Miller, Ph.D., Texas Woman's University.
Carol W. Shanklin, Ph.D., University of Tennessee.

Program description

The Department of Hotel, Restaurant, Institution Management and Dietetics offers a master of science degree in foodservice and hospitality management and administrative dietetics. The department participates in the College of Human Ecology doctor of philosophy program with a specialization in foodservice and hospitality management. Graduates are prepared for management and academic careers in the hospitality industry (foodservice and lodging) and dietetics. Courses are being developed for distance delivery.

Students may focus their study on issues related to hospitality management (foodservice and lodging) and dietetics. Graduate students have diverse academic and experience backgrounds, including foodservice management, dietetics, hotel and restaurant management, business, and social sciences.

Graduate faculty and students collaborate to conduct applied research and disseminate findings through scholarly publications and presentations. Flexibility in planning the program of study allows students to meet personal and professional objectives while enhancing knowledge of the discipline. Supportive faculty and peer relationships foster an environment where students may gain the knowlege, skills, and confidence needed for leadership positions in their chosen field.

Facilities

Research opportunities are available in the K-State residence halls and K-State Student Union and area hospitals, school foodservices, restaurants, and hotels. Graduate students are provided with work space and have access to computers in the department.

Admission

Admission to a graduate program in the Department of Hotel, Restaurant, Institution Management and Dietetics requires a bachelor's degree from an accredited institution. Regular admission requires a grade point average of 3.0 on a 4.0 scale. Prerequisite requirements include: management concepts, financial accounting, marketing, food production management, food safety, and 400 hours of industry experience. Students interested in hospitality management also will need prerequisite knowledge of hotel operations. All applicants are required to take the Graduate Record Examination or the Graduate Management Admission Test. International applicants are required to submit results from the Test of English as a Foreign Language. A TOEFL score of 570 is required for admission to M.S. and 600 to Ph.D. programs.

M.S. program

Application materials required include: application form; official transcript of all completed academic work; GRE or GMAT scores and TOEFL scores, if applicable; statement of objectives; resume; and three letters of recommendations. Application materials are reviewed by graduate faculty and recommendations forwarded to Graduate School.

Ph.D. program

Students desiring to apply for the Ph.D. submit the above materials to the College of Human Ecology Ph.D. Coordinator, Dean's Office, Kansas State University, 119 Justin Hall, Manhattan, Kansas 66506–1464. Deadlines for admission are February 1 for fall semester and August 1 for spring semester.

Program requirements

Master of science

Individual programs of study for the master of science degree are planned according to the background and interests of students. Students may choose one of the following plans:

30 hours of graduate credit consisting of 24 hours of graduate course work and 6 hours of research for a thesis, or 36 hours of graduate course work and a written comprehensive examination and oral defense.

Required course work for master of science

HRIMD 805	Food Production
	or
HRIMD 664	Lodging Management Theory
HRIMD 810	Research Techniques for Foodservice and Hospitality
HRIMD 885	Seminar in Foodservice and Hospitality Management
HRIMD 890	Administration of Foodservice and Hospitality Organizations
HRIMD 895	Cost Control for Foodservice and Hospitality Management

Graduate statistics course
Minimum 3 additional hours in HRIMD

Doctor of philosophy

The Ph.D. requires a minimum of 90 semester hours of credit beyond the bachelor's degree, including dissertation research for at least 30 hours. The number of hours from a previously completed master's degree which may be counted toward the 90 hour requirement is decided upon by the student's supervisory committee and reviewed by the chair of the College of Human Ecology coordinating committee and the Graduate School. A maximum of 30 hours may be transferred from a completed master's degree and a maximum of 9 credit hours can be transferred from graduate work completed after the master's degree at another university. Doctoral students are required to take written and oral preliminary examinations prior to admission to candidacy.

Required course work for Ph.D.

All required courses listed for master of science

HRIMD 980	Administration of Dietetics and Hospitality Programs
HRIMD 985	Advances in Foodservice and Hospitality Management
HRIMD 990	Dissertation Seminar
HRIMD 999	Research in Foodservice and Hospitality Management (30 minimum)

Statistics course(s) including analysis of variance, regression, and correlation
Experimental design course

See the Human Ecology section of this catalog for further information on the Ph.D. program.

Graduate assistantships

The department offers several graduate teaching and research assistantships. The Department of Housing and Dining Services cooperates with the HRIMD department and offers several graduate assistantships for students to work as managers in residence hall foodservice.

Students are selected based on academic standing and prerequisite skills required for the assignment. Students on assistantship are required to take a minimum of 6 and no more than 12 credit hours per semester and must maintain a 3.0 GPA on all undergraduate and graduate course work. Reappointment is based on maintaining a 3.0 or higher GPA and performance in the position during the previous semester. The level of support for students ranges from $700 to $900 per month. Students on four-tenths or higher assistantship are assessed fees at the in-state rate in accordance with Graduate School policy.

Hotel, restaurant, institution management, and dietetics courses

Undergraduate and graduate credit

HRIMD 510. Introduction to Clinical Dietetics. (1) Offered on demand. Application of concepts and skills in clinical dietetics in a simulated practice environment. One hour rec. per week. Pr.: FN 502; BIOCH 365; and BIOL 240; and conc. enrollment in FN 630.

HRIMD 515. Counseling Strategies in Dietetic Practice. (3) I. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods. Three hours lec. a week. Pr.: PSYCH 110; FN 450.

HRIMD 520. Applied Clinical Dietetics. (7) I, II. Application of principles of clinical nutrition in the nutritional care and education of persons throughout the life cycle. Must be taken concurrently with HRIMD 521. Pr.: FN 610, 630; and admission to coordinated program in dietetics.

HRIMD 521. Clinical Dietetic Practicum. (8) I, II. Supervised clinical/community experience in the nutritional care of patients/clients. Practicum experiences are arranged with participating healthcare facilities. Must be taken concurrently with HRIMD 520. Pr.: FN 610, 630; and admission to coordinated program in dietetics.

HRIMD 560. Management in Dietetics. (3) I, II. Functions of management in dietetic practice. Financial control, policy making, inter- and intra-departmental relationships, personnel issues, use of TQM and other quality assurance mechanisms. Pr.: HRIMD 455; ACCTG 231.

HRIMD 561. Management in Dietetics Practicum. (6) I, II. Supervised practice experience in the application of management principles in foodservice operations or other dietetics practice settings. Pr.: HRIMD 455; ACCTG 231 and admission to the coordinated program in dietetics and previous or concurrent enrollment in HRIMD 560.

HRIMD 570. Seminar in Hotel, Restaurant Management and Dietetics. (1) I, II. Current trends, research, and developments in hotel and restaurant management and dietetics. Pr.: Senior standing in hotel/restaurant management or dietetics practice.

HRIMD 621. Hospitality Law. (3) II. Legal aspects of managing hospitality operations and responsibilities for the operations, patron civil rights, governmental regulations, franchising and commercial transactions. Pr.: HRIMD 342, 362.

HRIMD 624. Procurement in the Hospitality Industry. (2) I. Principles and theories of procurement of food and supplies for hospitality operations. Includes management, financial, safety and ethical considerations in the procurement process. Pr.: HRIMD 342.

HRIMD 635. Foodservice Equipment and Layout. (2) I, II. Factors affecting the selection and arrangement of equipment in foodservice systems. Field trip required. Pr.: HRIMD 342.

HRIMD 640. Consultation in Hotel, Restaurant Management and Dietetics. (3) On sufficient demand. Development and management of small businesses or private practice within the dietetics or hospitality industry. Business plan development, marketing, cost considerations. Overview of consulting to healthcare and hospitality operations and examination of skills required for success. Pr.: HRIMD 342 and ACCTG 231.

HRIMD 664. Lodging Management Theory. (3) II. Application of management theories to the lodging industry including yield management, multicultural issues, marketing strategies, environmental issues, and future trends. Pr.: HRIMD 362.

HRIMD 665. Gaming Management. (2) On sufficient demand. Investigation of the impact of gaming on the foodservice and hospitality industry from the social, economical, political and environmental perspectives. Pr.: HRIMD 362, MANGT 420.

HRIMD 705. Computer Implementation in Foodservice and Hospitality Operations. (3). S, in alternate years. Review of computer development in foodservice and hospitality operations; development of criteria for implementation of a computer system; analysis of foodservice and hospitality hardware and software. Pr.: CMPSC 110; and HRIMD 480 or 560 or MANGT 420.

HRIMD 710. Readings in Foodservice and Hospitality Management. (1–3) I, II, S. Directed study of current literature in foodservice and hospitality management and related areas. Pr.: HRIMD 480 or 560 or MANGT 420.

HRIMD 785. Practicum in Foodservice Systems Management. (1–6) I, II, S. Professional experiences in approved foodservice organization as a member of the management team under faculty supervision. Pr. or conc.: HRIMD 342; and HRIMD 480 or 560 or MANGT 420.

Graduate credit

HRIMD 805. Food Production Management. (3) II, in alternate years. Production planning and controls in foodservice systems analysis in foodservice systems. Decision optimization and systems analysis in foodservice organizations. Consideration of various types of foodservice systems. Pr.: HRIMD 342; and HRIMD 480 or 560 or MANGT 420.

HRIMD 810. Research Techniques for Foodservice and Hospitality Management. (3) II. Survey and application of research methodology in foodservice and hospitality management. Pr.: STAT 702 or STAT 703.

HRIMD 820. Problems in Hotel, Restaurant, Institution Management and Dietetics. (Var.) I, II, S. Individual investigation of problems in foodservice and hospitality management. Conferences and reports at appointed hours. Pr.: HRIMD 342; and HRIMD 480 or 560 or MANGT 420.

HRIMD 885. Seminar in Foodservice and Hospitality Management. (1) I, II, S. Discussions of research related to foodservice and hospitality management. Pr.: Consent of instructor.

HRIMD 890. Administration of Foodservice and Hospitality Organizations. (3) I. Advanced study of management applied to foodservice and hospitality organizations. Pr.: HRIMD 480 or 560 or MANGT 420.

HRIMD 895. Cost Controls in Foodservice Systems. (3) I. Review of the components of cost control systems; analysis of financial data for foodservice operations; techniques for budget planning and control. Pr.: ACCTG 260; HRIMD 342; and HRIMD 480 or 560 or MANGT 420.

HRIMD 899. Research in Foodservice or Hospitality Management. (Var.) I, II, S. Individual research which may form the basis for master's report or thesis. Pr.: Consent of instructor.

HRIMD 980. Administration of Dietetics and Hospitality Programs. (3) II, in alternate years. An in-depth study of the development of dietetic and hospitality education and influence of the professional associations. Assigned observations and limited participation in administration of coordinated dietetics and hospitality management programs. Pr.: EDCEP 927 and consent of instructor.

HRIMD 985. Advances in Foodservice and Hospitality Management. (3) I, in alternate years. Analysis of selected topics and research in foodservice and hospitality management. Pr.: HRIMD 810 and consent of instructor.

HRIMD 990. Dissertation Proposal Seminar. (1) I, II, S. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, 3 hours of research design or methods, and consent of major professor.

HRIMD 999. Research in Foodservice or Hospitality Management. (Var.) I, II, S. Research in foodservice or hospitality management for the doctoral dissertation. Pr.: Consent of major professor.

For more information

For additional information and application materials please contact:
Carol Shanklin
Director of Graduate Studies
Department of Hotel, Restaurant, Institution Management and Dietetics
Kansas State University
103 Justin Hall
Manhattan, KS 66506–1404
785-532-5521
E-mail: shanklin@humec.ksu.edu
Home page: http://www.ksu.edu/humec/hrimd/hrimd.htm

Human Ecology

Indepartmental graduate program

Graduate faculty

Betsy B. Barrett, Ph.D., Kansas State University.
M. Betsy Bergen, MS, Ph.D., Kansas State University.
Marilyn Bode, Ph.D., Iowa State University.
Carl A. Boger, Jr., Ph.D., Purdue University.
Stephan R. Bollman, Ph.D., Iowa State University.
Deborah D. Canter, Ph.D., University of Tennessee.
Linda Cushman, Ph.D., University of Tennessee.
Mary De Luccle, Ph.D., Kansas State University.
Bronwyn Fees, Ph.D., Iowa State University.
Jane Garcia, Ph.D., University of South Alabama.
Barbara Gatewood, Ph.D., Purdue University.
Rebecca A. Gould, Ph.D., Texas Woman's University.
Linda A. Hoag, Ph.D., University of Illinois, Champaign.
Cathy Hsu, Ph.D., Iowa State University.
Janice E. Huck, Ph.D., Kansas State University.
Anthony P. Jurich, Ph.D., Pennsylvania State University.
Melody L. A. LeHew, Ph.D., University of Tennessee.
Elizabeth A. McCullough, Ph.D., University of Tennessee.
Deborah J. C. Meyer, Ph.D., Iowa State University.
Judy Miller, Ph.D., Texas Woman's University.
Virginia M. Moxley, Ph.D., Kansas State University.
Deanna M. Munson, Ph.D., Kansas State University.
Ann D. Murray, Ph.D., Macquarie University.
John P. Murray, Ph.D., The Catholic University of America.
Charlotte S. Olsen, Ph.D., Kansas State University.
Robert H. Poresky, Ph.D., Cornell University.
Gita Ramaswamy, Ph.D., Mississippi State University.
Candyce S. Russell, Ph.D., University of Minnesota.
Rick J. Scheidt, Ph.D., University of Nebraska.
Walter R. Schumm, Ph.D., Purdue University.
Carol Shanklin, Ph.D., University of Tennessee.
Ann B. Smit, Ph.D., Univeristy of Maryland.
Farrell Webb, PhD., University of Minnesota.
Betty Jo White, Ph.D., Virginia Polytechnical University.

The Ph.D. program in human ecology presents the opportunity for specialized study in one of five areas.

The Ph.D. program is offered by the graduate faculty members of the departments of apparel, textiles, and interior design; hotel, restaurant, institution management and dietetics; and the School of Family Studies and Human Services. A separate Ph.D. program is offered by the Department of Foods and Nutrition. Each student must identify a specialization when applying.

The following specializations are offered:

Family life education and consultation

The family life education and consultation specialization prepares candidates to conduct, administer, and evaluate programs for enhancing the quality of family life. This specialization requires course work in human development, family studies, family life education, research methods, evaluation, and applied practice in family and community service organizations. Graduates are qualified for positions in colleges and universities, cooperative extension, human service agencies, and similar professions.

Foodservice and hospitality management

The foodservice and hospitality management specialization integrates management and behavorial sciences concepts into the provision of quality food and services in diverse settings. Graduates are prepared with a knowledge base and skills to assume leadership roles in foodservice and hospitality management education, research, and practice.

Life span human development

The life span human development specialization emphasizes the growth and development of the individual over the course of a lifetime, the varying contexts of human development, and the processes underlying development throughout the life cycle. The program encompasses theory and research in child and adolescent development, adult development, gerontology, family studies, and thanatology. Graduates may prepare for careers in research, applied human services, or academic positions.

Marriage and family therapy

The marriage and family therapy specialization prepares professionals to conduct and critically evaluate therapy with marital and family groups. Students pursue a program of study that includes human development, family studies, marital and family therapy, statistics, and research methods. The doctoral program in marriage and family therapy is accredited by the Commission on Accreditation for Marriage and Family Therapy Education.

Apparel and textiles

The apparel and textiles specialization focuses on the historic, sociopsychological, economic, chemical, or functional design aspects of apparel and textiles. Research problems are approached from a systems perspective incorporating human and environ-

mental factors. The specialization prepares students for positions in higher education, business, industry, extension, museums, and/or government.

Programs of study

Each student, with the guidance of an advisor and a graduate committee, prepares an individualized program of study. Programs of study include a minimum of 90 credit hours beyond the bachelor's degree, with at least 30 hours course work in the major area, 30 hours in dissertation research, and the remainder in supporting courses. Inquiries should be directed to: Chair, Ph.D. Coordinating Committee, 119 Justin Hall, College of Human Ecology, Kansas State University, Manhattan, Kansas 66506–1401.

Human ecology courses

Areas of specialization and graduate faculty who support the Ph.D. program in human ecology are listed in the section on interdisciplinary programs. The following courses are offered by the College of Human Ecology but are not associated with a department.

DHE 615. Long-Term Care Administration Internship. Includes field experience in the general administration of long-term care programs and/or facilities; planning, budgeting, program management, and service delivery; exposure to federal and state standards and regulations governing long-term care; and professional leadership development. Prior or conc. enrollment in GERON 610 Seminar in Long-Term Care Administration is also required. Pr.: Junior standing, completion of 15 hours of gerontology course work, MANGT 420 and ACCTG 231, and a GPA of 2.5 or above (3.0 and above in long-term care courses).

GNHE 780. Problem in General Human Ecology. (Var.) I, II, S. Individual investigation into work in general human ecology. Pr.: Consent of the instructor.

For more information

For additional information and application materials please contact:
Carol Shanklin
Human Ecology Graduate Program
Kansas State University
103 Justin Hall
Manhattan, KS 66506–1405
Home page: http://www.ksu.edu/humec/

Industrial and Manufacturing Systems Engineering

Head
Bradley A. Kramer

Director of graduate studies
Stanley Lee

Graduate faculty
Farhad Azadivar, Ph.D., Purdue University.
David Ben-Arieh, Ph.D., Purdue University.
Shing Chang, Ph.D., Ohio State University.
Mike Harnett, Ph.D., University of Alabama in Huntsville.
Bradley A. Kramer, Ph.D., Kansas State University.
Jerome Lavelle, Ph.D., North Carolina State University.
Stanley Lee, Ph.D., Princeton University.
Malgorzata Rys, Ph.D., Kansas State University.
Chih-Hang Wu, Ph.D., Penn State University.

Academic programs

The department conducts graduate programs emphasizing the following areas: manufacturing systems, operations research, human factors (ergonomics) and engineering management. Master's and doctoral enrollments approximate 60 and 15 respectively.

The Department of Industrial and Manufacturing Systems Engineering offers the following degrees/options at the graduate level:

M.S. in industrial engineering (MSIE)

M.S. in operations research (MSOR)

Master of engineering management (MEM)

Ph.D.

Master of science programs may be formulated using either thesis or report formats. Each program requires a minimum of 30 credit hours of graduate courses. Doctoral programs require 60 hours of graduate credit beyond the M.S. degree. A significant original research project documented in the form of an acceptable dissertation is required. The dissertation must be of sufficient quality and importance to merit publication in a refereed journal.

The master of engineering management degree is a course-work-only program that is offered to both on-campus and to off-campus students via distance learning media.

Program requirements

To pursue the MSIE graduate degree, students must hold a B.S. degree in engineering and be versed in several of the basic areas of industrial engineering. Non-industrial engineering undergraduates generally require 9 semester credits of remedial courses. GRE scores are required for all students who apply to our graduate program.

To pursue the engineering management degree, one must hold a B.S. degree in engineering, mathematics, or physical science. GRE scores are required for all students who apply to the program. Students who hold a degree in engineering, mathematics, statistics, computing science, physical science, biological science, or economics and have a strong quantitative background are eligible for the M.S. in operations research.

See the Engineering section of this catalog for information on Ph.D. programs.

Research emphases

Research in the Department of Industrial and Manufacturing Systems Engineering is conducted in five primary areas.

Ergonomics
Improve how humans work with machines and each other. Develop safe and productive work environments.

Manufacturing systems
Design and improve manufacturing systems with respect to product quality and system productivity.

Operations research
Expand the methodologies available for solving decision problems in engineering, economics, business and social systems. Incorporates applied mathematics and computer technologies into solution methods.

Quality engineering
Control manufacturing cost through manufacturing process improvement. Diagnose quality problems to improve product quality.

Uncertainty representation and reasoning
Improve engineering decision making, which is based on many uncertainties and approximations.

Major research facilities and equipment

The department of engineering has well-equipped laboratories supporting some of its research activities. Additional research is conducted in the field using industrial facilities.

The ergonomics laboratory contains measurement apparatus for assessing stress levels imposed on human workers by various job designs and work environments.

The manufacturing processes laboratory consists of a wide range of manufacturing process equipment that can support research involving basic manufacturing processes. The laboratory includes numerous lathes and milling machines, a foundry with gas-fired and electric induction furnaces, molten salt heat treat facility, gas-flame metal cutting and joining processes, various welding processes, and material properties measurement equipment.

The Computer Integrated Manufacturing laboratory is a modern, well-equipped computer controlled manufacturing system. Equipment included in the lab are computer numerically controlled (CNC) machining centers, robots, programmable logic controllers, a programmable conveyor, and computer workstations for computer-aided design and computer-aided manfacturing. In addition, students in manufacturing engineering have access to additional industrial equipment such as a CNC laser, computer controlled coordinate measuring machine, CNC press, and additional computer workstations and machining centers in our Manufacturing Learning Center.

The quality engineering laboratory supports demonstrations and projects involving the control of quality related aspects of manufac-

turing processes. The lab includes a computer-controlled, bench scale simulated manufacturing facility.

The departmental computing laboratories are modern and well equipped. IMSE students have access to these labs 24 hours a day.

Financial support

Financial support for a number of teaching and research assistants is available. However, the requests for this support regularly exceed the funding available. Awards are made on a competitive basis. The awarding of financial assistance is separate and distinct from admission to the graduate program. Many students choose to enroll without financial assistance to pursue the various graduate degrees and options in industrial and manufacturing systems engineering.

Industrial and manufacturing systems engineering courses

IMSE 501. Industrial Management. (3) I, II. Basic functions in an industrial organization and their interrelationships; management considerations involving product, process, plant, and personnel. Three hours rec. a week.

IMSE 530. Industrial Project Evaluation. (3) I, II. The evaluation of the economic aspects of industrial projects. Focus on decision making among competing alternatives. Concepts of time-value of money, effects of taxation, depreciation, and inflation. Methods of comparing alternatives are developed, including: equivalent worth, rate of return, payback period, and benefit-cost ratio. Risk/uncertainty, sensitivity, break-even and replacement analysis as well as estimating methods and cost concepts. Three hours rec. per week. Pr.: MATH 222.

IMSE 541. Statistical Quality Control. (3) I, II. Normal, binomial, and frequency distributions. Seven process improvement tools. Control charts on means and variances for variables and attributes. Design of experiment for process and product design. Acceptance sampling plants. Two hours rec. and two hours lab a week. Pr.: IMSE 373. Pr. or conc.: STAT 511.

IMSE 555. Industrial Facilities Layout and Design. (3) I, II. Design of industrial facilities with emphasis on manufacturing engineering and material handling. Two hours rec. and two hours lab a week. Pr.: IMSE 250 and IMSE 251 and IMSE 530.

IMSE 560. Introduction to Operations Research I. (3) I, II. A study of the methods of operations research including model formulation and optimization. Topics include: assignment/transportation problems, linear programming, network flows. Three hours lec. a week. Pr.: IMSE 373, and MATH 222.

IMSE 563. Manufacturing Processes Engineering. (4) II. A study of the effects of operating variables on manufacturing processes such as machining, metal forming, casting, welding, plastics, etc. Emphases are on manufacturing process theory, process variables measurement, and the technical inferences of collected data. Strength of materials, manufacturing process theory, instrumentation, computer data acquisition, and data analysis concepts are included. Laboratory testing of manufacturing processes and the engineering design of experiments for process variable measurements are used to develop efficient manufacturing processes. Three hours rec. and three hours lab a week. Pr.: IMSE 250 and IMSE 251, CHE 352, CE 530 or Statics equiv.

IMSE 564. Product and Process Engineering. (3) I. A study of the interrelationships between product design and production process selection. Emphasis is on the development of economic production systems for discrete products in a competitive manufacturing environment. Concepts of design for manufacture and assembly, tool engineering, and manufacturing systems design are included. Two hours lec. and three hours lab per week. Pr.: IMSE 250 and IMSE 251 and IMSE 530.

IMSE 575. Quantitative Techniques in Industrial Engineering. (3) I, II. Problem formulation and conceptual models; application of finite mathematics and other techniques to problems of industrial engineering and management. Three hours rec. a week. Pr.: MATH 222.

IMSE 601. Introduction to Systems Management. (3) II. A general introduction to the formulation and mathematical solution of management and business problems. Includes the formulation of business and management problems and their solutions, utilizing optimization theory, finite mathematics, and statistical techniques. Taught at Ft. Leavenworth only. Three hours rec. a week. Pr.: MATH 222 and consent of instructor.

IMSE 602. Topics in Industrial Engineering. (Var.) I, II, S. Lectures on recent topics in industrial engineering.

IMSE 604. Independent Study of Industrial Engineering. (Var.) I, II, S. This course involves independent study at the introductory graduate level.

IMSE 605. Advanced Industrial Management. (3) I. Contemporary management philosophies and their impact on engineers and engineering managers. Topics include: total quality management, re-engineering, advanced quality initiatives, leadership, and strategic planning. Three hours recitation per week. Pr.: IMSE 501.

IMSE 610. Occupational Safety Engineering. (3) II. An overview of factors affecting safety in organizations, emphasizing analysis techniques and design strategies. Topics include occupational safety, accidents, fire protection, industrial hygiene, hazardous waste, toxicology, radiation safety, product liability and federal standards. A project involving a hazard analysis and the design of a solution for a field location is required. Three hours lec. a week. Pr.: IMSE 250 and IMSE 251.

IMSE 612. Hazardous Materials Management. (2) I. All aspects from generation to final disposal will be studied, including: identifying hazardous materials, chemical safety, storing and shipping chemicals, and treatment and disposal of hazardous wastes. Two hours lec. a week. Pr.: CHM 230.

IMSE 623. Industrial Ergonomics. (3) I, II. Process analysis and charting; principles of motion economy and ergonomics; work stations and environments; micromotion analysis and an introduction to standard data systems. Two hours rec. and three hours lab a week. Pr. or conc.: STAT 510.

IMSE 625. Work Environments. (3) II. Basic structure and performance of the human, viewed as a component in information processing and control systems. Effect of visual, auditory, toxic, and thermal environments. Two hours rec. and two hours lab a week. Pr.: IMSE 250 and IMSE 251.

IMSE 633. Production Planning and Inventory Control. (3) I, II. Principles, techniques, and applications of production planning and inventory control. Design of control systems. Three hours rec. Pr.: IMSE 250 and IMSE 251. Pr. or conc.: IMSE 560.

IMSE 641. Statistical Process Control in Manufacturing. (3) II. An introduction to the modern practice of quality engineering concepts, systems, strategies, and tools. Topics include advanced techniques related to statistical process control, international quality standards, quality data management, and automatic inspection. Three hours lec. a week. Pr: STAT 511.

IMSE 643. Industrial Simulation. (3) I, II. Basic concepts of computer simulation modeling of manufacturing, production, service and other systems. Use of a commercial simulation software environment to build, analyze, verify and validate models. Use of models as a system design tool. Three hours rec. per week. Pr. or conc.: STAT 511.

IMSE 660. Introduction to Operations Research II. (3) I, II. Continuation of IMSE 560. Topics are decision theory, nonlinear programming, dynamic programming, Markovian decision processes, and queuing theory. Three hours lec. a week. Pr.: IMSE 530, IMSE 560, STAT 510.

IMSE 662. Computer Aided Manufacturing. (3) I. Concepts in CAM, integrated control of machine tools and transport devices with production control. Concepts of CAM and automated assembly in small lot production environment. Two hours lec. and three hours lab a week. Pr.: IMSE 250 and IMSE 251 and CIS 209 or equiv.

IMSE 671. Topics in Automated Factory Concepts. (3) I. Introduction to concepts of automation, automatic transfer lines and CAD/CAM. Emphasis on robots and their role in automated factories. Concepts of group technology, computer-aided process planning, automated material handling equipment for automated factories. Three hours lec. a week. Pr.: IMSE 633 and 662.

IMSE 672. Robotic Applications. (3) II. History, development of the work environment for robots, their application and implementation. Concepts of control and sensory feedback in robots are covered. Three hours lec. a week. Pr.: IMSE 250 and IMSE 251 and CIS 209.

IMSE 685. Principles of Manufacturing Information Systems. (3) II. Introduction to the theory and concepts of information for manufacturing. Design of manufacturing systems such as MRP, SFRS, CAD/CAM, etc. Concerns of integration and man-machine interface in manufacturing systems. Three hours lec. a week. Pr.: IMSE 633.

IMSE 751. Applied Decision Theory. (3) II, in alternate years. Bayes theorem, Bayesian estimators, utility, loss function and risk, minimax strategies, elementary game theory. Three hours rec. a week. Pr.: STAT 511 or equiv.

IMSE 780. Methods of Operations Research. (3) II. An overview of O.R. at the graduate level. After this course, the student will have the general basic knowledge in O.R. and a better idea about the usefulness and interrelationships of the various subjects in O.R. Topics to be covered include the various optimization techniques, stochastic processes and optimization, and the various approaches in the treatment of uncertainty. Three hours recitation per week. Pr.: MATH 222 and STAT 510.

IMSE 802. Advanced Topics in Industrial Engineering. (Var.) I, II, S. Lectures on recent advanced topics in industrial engineering.

IMSE 804. Advanced Independent Study in Industrial Engineering. (Var.) I, II, S. This course involves independent study of recent advanced topics in industrial engineering.

IMSE 805. Engineering Administration. (3) I. Engineering administration; organization factors in decision-making. Three hours rec. a week. Pr.: IMSE 501.

IMSE 806. Engineering Project Management. (3) II. Planning, scheduling, and controlling engineering projects. Includes determination of appropriate project team, cost/benefit analysis, PERT and CPM scheduling techniques, reporting, and use of computerized project management tools. Three hours lec. a week. Pr.: IMSE 501 and IMSE 530.

IMSE 810. Industrial Logistics Engineering. (3) on sufficient demand. Models for developing a logistics strategy and making logistical decisions. Three hours rec. per week. Pr.: MATH 240.

IMSE 811. Advanced Production and Inventory Control. (3) II. Analytical and mathematical methods of making decisions on production, inventories, human resources, and shipping in modern industrial plants. Three hours rec. a week. Pr.: IMSE 633.

IMSE 820. Intelligent Manufacturing Systems. (3) II. Concepts and applications of machine intelligence to manufacturing process and systems. Each student will develop a prototype system which demonstrates the appropriate application of machine intelligence to solve a practical integrated manufacturing systems problem. Two hours rec. and three hours lab a week. Pr.: IMSE 671 or equiv.

IMSE 822. Advanced Engineering Economy. (3) (alternate years). This course expands on the principles of the fundamental engineering economics analysis. Emphasis is placed on quantification and evaluation of risk and uncertainty factors, capital allocation and budgeting concerns, the effects of inflation, economics consequence estimating models, engineering capital equipment replacement analyses and decision-tree and multi-attribute decision models in the context of engineering economics analysis of engineer-

ing problems. Lecture style with mini-projects, spreadsheet applications and group discussions to enhance learning. Three hours lec. a week. Pr.: IMSE 530, or ME 560, or CE 680, or equivalent.

IMSE 825. Tribology in Manufacturing. (3) Taught on sufficient demand. An introduction to system approach to Tribology; Surface Topography; Physical, Chemical, and Geometric Nature of Surfaces; and the Mechanics of contact between surfaces. This course also investigates various theories of friction and wear; hydrodynamic; elastohydrodynamic, and boundary lubrication; frictional instabilities; rolling contact problems; and application of system methodology to tribological problems in engineering design and manufacturing. Pr.: PHYS 214 and IMSE 563.

IMSE 830. Applied Fuzzy Set Theory. (3) I. The emphasis will be on applicational aspects. Topics covered are elementary fuzzy set theory, fuzzy measure, possibility theory, fuzzy linear programming and other fuzzy optimization techniques, fuzzy linguistics and expert systems, fuzzy production and inventory control, and fuzzy operations research models. Three hours rec. a week. Pr.: STAT 510.

IMSE 836. Operations Research and Artificial Intelligence. (3) I, II. An introduction to the problems related to the development of expert systems and application of AI techniques to engineering. Emphasis is on using optimization techniques in dealing with large knowledge bases. Topics include question asking strategies, the clause satisfiability problem, and inferring rules from examples. Three hours lec. a week. Pr.: IMSE 560 and knowledge of a scientific programming language.

IMSE 841. Advanced Topics in Quality Engineering. (3) I. A survey of current advances in quality engineering. Includes both off-line and on-line quality engineering. Three hours lec. a week. Pr.: STAT 704, 705 and IMSE 641 and knowledge of Lotus 123 and (Fortran, Pascal or C).

IMSE 842. Reliability Theory I. (3) I. The mathematics of reliability theory. The hazard function. Calculation of failure density and mean life for series, parallel systems, and various types of standby systems. Hypotheses tests on mean life. Left testing with censoring. Three hours rec. a week. Pr.: STAT 511 or equiv.

IMSE 843. Reliability Theory II. (3) II, (alternate years). Maintenance and repair models, availability, using Laplace transforms and Markovian analysis. Basics of Bayesian decision theory with applications to reliability theory. Three hours rec. a week. Pr.: IMSE 842.

IMSE 850. Ergonomics (Human Factors) Engineering I. (3) I. The design and analysis of applied experimental research on human behavior as applied to engineering systems. An experimental project. Two hours rec. and three hours lab a week. Pr.: STAT 702 or 703.

IMSE 865. Simulation of Industrial Management Systems. (3) II. Simulating industrial management systems on computers utilizing Monte Carlo techniques and simulation languages. Numerical methods related to simulation. Three hours rec. a week. Pr.: IMSE 643.

IMSE 867. Modeling of Manufacturing Systems. (3) II. Discussion and application of various techniques used in modeling manufacturing systems. Techniques included are discrete event computer simulation, queuing models, network models and neural network models. Three hours lec. a week. Pr.: IMSE 643.

IMSE 871. Advanced Topics in Computer Integrated Manufacturing. (3) II. Modern issues of computerized manufacturing considering both hardware and software approaches and methods. Advanced concepts in intelligent machine programming and applications, group technology, computer aided process planning, and scheduling will be discussed. Research issues will be presented. Three hours lec. a week. Pr.: IMSE 633, IMSE 662 or equivalents.

IMSE 872. Industrial Forecasting Techniques and Applications. (3) I. The problems of model construction for industrial forecasting. The application of least squares, regression, exponential smoothing, and adaptive fitting will be studied in solving industrial engineering problems. Three hours rec. a week. Pr.: STAT 511 or 705.

IMSE 873. Industrial Systems Analysis. (V) II. Analysis and synthesis of automatic control systems with application to machines and processes and industrial management systems. A study of optimal control, stability, and sensibility of industrial management systems. Three hours rec. a week. Pr.: Consent of instructor and IMSE 600.

IMSE 881. Linear Programming. (3) II (alternate years). Development of the theory of linear programming and related topics including simplex methods, duality theory, integer programming, transportation methods, and stochastic linear programming. Application to industrial problems and the use of computer solutions are emphasized. Three hours rec. a week. Pr.: IMSE 560.

IMSE 883. Discrete Optimization. (3) (On sufficient demand). Optimization problems involving discrete variables. Solution methods include single- and multiple-branch implicit enumeration and cutting methods. Focus in on problem formulations and solution tractability. Three hours lec. a week. Pr.: IMSE 560.

IMSE 885. Advanced Manufacturing Information Systems. (3) I. Survey of topics in Computer Integrated Manufacturing. Issues such as the Manufacturing Automation Protocol (MAP), representation of solids in CAD, storage and retrieval of such information are considered. Three hours lec. a week. Pr.: IMSE 685 or equivalent.

IMSE 892. Graduate Seminar in Industrial Engineering. (0) I, II. Presentation and discussion of topics of contemporary interest in industrial or manufacturing engineering. M.S. and Ph.D. candidates make one presentation. One one-hour seminar meeting a week.

IMSE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

IMSE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

IMSE 950. Human Factors. (3) II. The design and execution of applied experimental research on human behavior as applied to engineering systems. An experimental project. Three hours rec. a week. Pr.: STAT 702 or 703.

IMSE 971. Industrial Queuing Processes. (3) I, II. Introduction to the queuing process and theory of queues; analysis of single and multistation queues; application to production, materials handling, inventory and maintenance systems. Three hours rec. a week. Pr.: STAT 510.

IMSE 976. Scheduling Theory. (3) I, II. Project scheduling, assembly line balancing, shop scheduling, basic structure, measures of performance, combinatorial and statistical aspects. Various approaches to the analysis of shop scheduling. Three hours rec. a week. Pr.: Consent of instructor.

IMSE 982. Nonlinear Programming. (3) I, II. Study of nonlinear models and their solution. Topics covered are nonlinear programming including Kuhn-Tucker theory, quadratic programming, separable programming, geometric programming, gradient and search methods, quasilinearization, and invariant imbedding. Three hours rec. a week. Pr.: STAT 510.

IMSE 983. Dynamic Programming. (3) I, II. A study of the optimization of multistage decision processes based on the application of the principle of optimality. Stochastic and deterministic models are developed. Three hours rec. a week. Pr.: STAT 510.

IMSE 990. Advanced Topics in Operations Research. (Var.) I, II, S. (6 hrs. maximum). Study of topics related to operations research not covered in other courses. Selected according to the interests and needs of graduate students. May be repeated. Pr.: Consent of instructor.

IMSE 991. Multiple Criteria Decision Making. (3) I, II. Decision processes for problems involving multiple conflicting criteria; multiple attribute decision making; multiple objective decision making, and group decision making under multiple criteria. Various methods/approaches for different problems are discussed. Three hours rec. a week. Pr.: IMSE 560 and IMSE 874.

IMSE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head.

For more information

For additional information and application materials please contact:
Graduate Program Coordinator
Department of Industrial and Manufacturing System Engineering
Kansas State University
237 Durland Hall
Manhattan, KS 66506–5101
785-532-5606
Home page: http://www.imse.ksu.edu/

Interior Architecture

Head
Stephen M. Murphy

Director of graduate studies
Stephen M. Murphy

Graduate faculty
Gwen Owens-Wilson, PhD, U. of Tennessee; Registered Architect.

Carolyn Thompson, M of Arch, Columbia University.

Although Kansas State University does not offer a graduate degree in interior architecture, the following courses are available for graduate credit and, when appropriate, may be used to support graduate degrees in other departments.

Interior architecture

Undergraduate and graduate credit

IAR 520. Design Graphics Workshop. (3) I, II, S. A course in the use of colored pencils, to render and present form and space using different techniques. Emphasis on the visual perception and composition of elements in design drawings and presentation. Pr.: Soph. standing.

IAR 600. Design Studio IV Lecture. (1) I. Lecture must be taken concurrently with IAR 602, Design Studio IV. Covers design-related issues and conditions associated with design applications specific to contemporary large-scale office planning and instructs in the use of the students' personal computers for specific office-systems software and presentation; systems software utilized in IAR 602, Design Studio IV. To drop this course you must also drop IAR 602. Pr.: IAR 410, IAR 404, and IAR 403; not more than one "D" in an IAR design studio course.

IAR 602. Design Studio IV. (4) I. Must be taken concurrently with IAR 600 Design Studio IV Lecture. This course is directed towards the unique programming and design related issues and conditions associated with contemporary large-scale office space planning. Emphasis is placed on the nature of the office work environment, and the linking together of various architectural systems. Heavy emphasis is placed on using students' personal computers to design and prepare presentations. Another component of this course is the application of the computer to resume writing and portfolio preparation using printed materials as well as CD's and videos. To drop this course you must also drop IAR 600 Design Studio IV Lecture. Pr.: IAR 410, IAR 404, and IAR 403; not more than one "D" in an IAR design studio course.

IAR 606. Design Studio V. (1) II. Must be taken concurrently with IAR 607 Design Studio V Lecture. Provides an option for an interdisciplinary collaborative studio experience oriented towards replicating the learning experience and interactive activities that take place in the modern multi-disciplinary professional office. Students from Architecture, Interior Architecture, and Landscape Architecture may enroll. To drop this course you must also drop IAR 606. Pr.: IAR 600 and IAR 602; not more than one "D" in an IAR design studio course.

IAR 607. Design Studio V Lecture. (1) II. Lecture must be taken concurrently with IAR 606 Design Studio V. Covers design-related issues and conditions associated with the design applications specific to the community-based projects selected for a given semester. Projects which include commercial buildings, historic preservation, competitions in the design professions, and collaborative studio experience, replicate the learning experience and interactive activities that take place in the modern multi-disciplinary professional office. Students from Architecture, Interior Architecture, and Landscape Architecture may enroll. To drop this course you must also drop IAR 606. Pr.: IAR 600 and IAR 602; not more than one "D" in an IAR design studio course.

IAR 644. Interior Architecture Internship. (13) II, S. Thirty weeks off-campus work study in professional offices specializing in interior architecture: field and office experience. Pr.: IAR 603, ARCH 433, not more than one grade of D in an interior architecture design studio, and approval by the internship coordinator.

IAR 645. Interior Architecture Internship Report. (2) II, S. Taken in conjunction with IAR 644. The purpose is to develop the student's communication skills and awareness of the importance of written communication and record keeping in interior architectural office practice. The required report will provide a detailed documentation of the student's experiences encountered during internship. Pr.: conc. enrollment in IAR 644.

IAR 646. Interior Architecture Foreign Studies. (13) II, S. This course allows the student to study outside of the United States for one semester. The semester will expand their global perspective of design professions, cultural, political, and economic views. One semester studying interior architecture in a foreign university. Pr.: IAR 603, ARCH 433, not more than one grade of D in an interior architecture design studio and approval by the foreign studies coordinator.

IAR 647. Interior Architecture Foreign Studies Reports. (2) II, S. Taken in conjunction with IAR 646. The purpose is to develop the student's written communication skills as well as increase awareness of written communication and record keeping in interior architecture office practice. The report will provide detailed documentation of the student's experiences during the Foreign Studies Program. Pr.: conc. enrollment in IAR 646.

IAR 705. Design Studio VI. (4) I, II. Must be taken concurrently with IAR 708 Design Studio VI Lecture. Pursues and extends the architectural knowledge gained in all previous studios. Emphasis is on understanding large-scale buildings in terms of structure, systems, materials and environment; also addresses the built environment, utilizing existing large-scale buildings to explore architectural renovation, rehabilitation, restoration and preservation. Students from Architecture, Interior Architecture, and Landscape Architecture may enroll. Pr.: IAR 606 and 607, or IAR 644 and IAR 645, or IAR 646 and IAR 647; not more than one "D" in an IAR design studio course.

IAR 706. Product Design Studio II. (4) I, II. Must be taken concurrently with IAR 707 Production Design Studio II Lecture. Advanced design projects involving products related to the interior environment. Synthesis of the design, materials, construction, and finishing of prototype products relevant to human use. To drop this course, you must also drop IAR 707. Pr.: IAR 606 and 607, or IAR 644 and 645, or IAR 646 and IAR 647; not more than one "D" in an IAR design studio course.

IAR 707. Product Design Studio II Lecture. (1) I, II. Lecture must be taken concurrently with IAR 706 Production Design Studio II. Emphasizes technical information about product design, materials, and construction and finishing of prototype products relevant to human use; also provides the information base for the studio applications and product design process. To drop this course, you must also drop IAR 706. Pr.: IAR 606 and 607, or IAR 644 and IAR 645, or IAR 646 and 647; not more than one "D" in an IAR design studio course.

IAR 708. Product Design Studio VI Lecture. (1) I, II. Lecture must be taken concurrently with IAR 705 Design Studio VI. Emphasizes technical instruction about structures, systems, materials, and environment as related to existing large-scale buildings and groups of buildings to explore architectural renovation, rehabilitation, restoration, and preservation. Stresses programming and decision-making when working with community-based projects or with civic, governmental, or charitable groups. Students from Architecture, Interior Architecture, and Landscape Architecture may enroll. To drop this course, you must also drop IAR 705. Pr.: IAR 606 and 607, or IAR 644 and 645, or IAR 646 and 647; not more than one "D" in an IAR design studio course.

IAR 720. Advanced Seminar in Interior Architecture. (I–3) I, II. Advanced readings and discussions of environmental issues related to the practice of interior architecture. Readings, discussions, reports. Pr.: IAR 702 or equiv.

IAR 730. Facility Management. (2) I. A survey of the methods of managing the physical assets of large facilities (corporate, institutional, and governmental) through a review of current literature, presentations by professionals active in the field, and case studies. Pr.: senior or grad standing.

IAR 740. Advanced Design Workshop. (I–4) I, II. Advanced instruction in the design, construction, and finishing of contemporary furniture and accessories. The course involves the development of a concept for a complex furniture prototype and includes research, program development, design development, criteria examination and determination, design development, working drawings, complete prototype development, and presentation drawings. Pr.: IAR 714 or equivalent.

IAR 753. Professional Practice. (3) I, II. Studies of conventional and newly developing modes of professional design practice. Presented are the relationships of interior architects, architects, and landscape architects and other design professionals to users, clients, building industry, society, government, and one another. Pr.: Fifth year standing.

IAR 756. Theory of Product Design. (2) II. History and design theory related to analysis materials and construction in product design. Pr.: IAR 420

IAR 760. Interior Architecture Seminar. (3) I. Readings and discussion of contemporary thought and movements within the field of interior architecture with special emphasis on the societal factors which produce and affect change. Pr.: IAR 602 or graduate standing.

Graduate credit

IAR 821. Advanced Interior Architectural Design. (I–4) I, II. Advanced study of interior space planning and interior design. Pr.: Professional design degree.

IAR 830. Problems in Interior Architecture. (Var.) I, II. Study of specific interior architectural problems under direct supervision of the departmental staff. Pr.: Professional design degree.

For more information

Home page: http://aalto.arch.ksu.edu/iar/

Kinesiology

Head

David A. Dzewaltowski

Director of graduate studies

Timothy Musch

Graduate faculty

Tom Barstow, Ph.D., University of California–Davis.

David Dzewaltowski, Ph.D., University of Iowa.

Craig Harms, Ph.D., Indiana University.

Richard McAllister, Ph.D., SUNY Health Science Center, Syracuse.

Mary McElroy, Ph.D., University of Maryland.

Tim I. Musch, Ph.D., University of Wisconsin–Madison.

Larry Noble, Ph.D., University of Texas at Austin.

David Poole, Ph.D., University of California–Los Angeles.

Overview

Kinesiology is the systematic study of human movement that integrates information drawn from a number of domains to form its own unique body of knowledge. As a life science area, the study of kinesiology requires both breadth and depth in content, as well as strong grounding in scientific inquiry skills. Kinesiology provides an informed understanding of the role of physical activity to an individual's physical and mental health.

Degree program

The Department of Kinesiology offers a master of science degree. Students may emphasize exercise physiology, exercise and sport psychology, biomechanics, or sociocultural aspects of human movement. Students may also choose an integrated program in clinical and community kinesiology for preparation as a physical activity promotion and chronic disease prevention and rehabilitation specialist. The clinical and community kinesiology emphasis prepares students to seek certification from the American College of Sports Medicine and work in such areas as hospital, corporate, or community wellness facilities.

The specific program of study, designed by the student and supervisory committee, is tailored to meet the individual needs and interests of the student. An individual's program of study consists of a minimum of 30 graduate hours. A maximum of 12 hours of supporting work in other departments may be applied toward the 30 hour requirement. Students choose from one of two different degree options: master's thesis or course work. All students are expected to demonstrate a depth and breadth of understanding of kinesiology in a written and/or oral final evaluation.

Research facilities

Biomechanics, exercise and sport psychology, and human exercise physiology laboratories are located in the Department of Kinesiology. The department's animal research laboratories are housed within the Department of Anatomy and Physiology in the College of Veterinary Medicine facilities. The Lifestyle Improvement through Fitness Enhancement (LIFE) community fitness laboratory provides prevention and rehabilitation exercise services to a variety of groups including corporate employees, youth, and older adults. Graduate students are provided many opportunities to work in both research and physical activity service settings.

Program strengths

The kinesiology faculty has emerged as a national leader in the science of health-related physical activity. Graduate education, research, and service activities are supported by grants from the National Institutes of Health as well as private corporations and health foundations. Strong collaboration

efforts with other academic units on campus such as the departments of anatomy and physiology, foods and nutrition, and extension community health provide valuable research and applied professional preparation opportunities for students.

Admission

Incoming students must satisfy a minimum number of undergraduate competencies. These competencies are often satisfied with an undergraduate degree in kinesiology. Students without an undergraduate degree in kinesiology may be required to complete additional undergraduate course work. Application procedures require (1) a completed graduate application form, (2) transcripts from all universities and colleges attended, (3) scores on the aptitude portion of GRE examination, (4) three letters of reference, and (5) a statement outlining professional goals and areas of special interest. Application for admission to the program in the fall semester should be made in the preceding late fall or early winter. Applications are also accepted for the spring semester.

Financial support

Graduate research and teaching assistantships are available and are renewable for two years. Assignments include assisting with faculty research, teaching laboratory portions of kinesiology courses, and working in adult, corporate, and disease prevention and rehabilitation exercise programs. Graduate assistantships are also available from the following university units: Lafene Health Center and Department of Intercollegiate Athletics. Contact these units directly for further information. Applications for assistanships should be made as early as possible.

Kinesiology courses

Undergraduate and graduate credit for non-kinesiology majors

KIN 510. Measurement and Research Techniques in Kinesiology. (3) II. Theory and techniques of measurement and research in the psychomotor domain including the use of statistical analyses. Pr.: KIN 320, 330, 335, 340, STAT 320.

KIN 515. History of Sport. (3) The historical development of sport (especially in Europe and North America) including the growth of competition, the rise of mass spectator sports, elitism, and the changing function of sport. History of sport as business and history of the relationship between sport and other institutions. Cross-listed with History, see HIST 515.

KIN 520. Practicum in Exercise Science. (1–3) I, II. Practical experiences in the fitness setting such as observation and participation in exercise testing and prescription, exercise leadership, and record keeping and program management. Pr.: Consent of instructor.

KIN 590. Seminar in Kinesiology. (3) II. Issues and problems involving integration of the subdisciplines of kinesiology and professional areas of application. Pr.: Completion of all or concurrent enrollment in final kinesiology core courses.

KIN 598. Topics in Kinesiology. (1–3) On sufficient demand. Study of a selected topic in kinesiology involving either an in-depth study or application of theory presented in a related core course. May be repeated as topic varies. Pr.: Related core course.

KIN 599. Independent Studies in Kinesiology. (1–3) I, II. Selected topics in kinesiology. Maximum of 3 hours applicable towards a degree. Pr.: Consent of undergraduate coordinator.

Undergraduate and graduate credit

KIN 600. Exercise Psychology. (3) I. An examination of the theory and research related to the biopsychosocial antecedents of exercise participation. Topics will include exercise motivation models of exercise perception and intervention strategies used to increase exercise participation. Pr.: KIN 250, KIN 340, and KIN 345.

KIN 601. Cardiorespiratory Exercise Physiology. (3) I. An examination of the structure and function of the respiratory system and the manner in which oxygen passes from the atmosphere to its site of utilization in the mitochondria. Exercise and environmental stresses will form the basis for examining the capacity, plasticity and limitations to respiratory function. Pr.: KIN 250 and KIN 335. Cross listed with Anatomy and Physiology; see AP 601.

KIN 602. Gender Issues in Sport and Exercise. (3) II. An examination of the impact of exercise and fitness trends on women in contemporary society with particular emphasis on how society presents obstacles to exercise and fitness. Topics include the relationship between exercise patterns and family structure, cosmetic fitness, eating disorders, and social class. Pr.: KIN 250, KIN 340 and KIN 345.

KIN 603. Cardiovascular Exercise Physiology. (3) II. Study of the structure and function of the cardiovascular system as it pertains to acute and chronic exercise. Topics include the control of blood pressure, vascular volume and blood flow during orthostasis and exercise. Pr.: KIN 250 and KIN 335. Cross-listed with Anatomy and Physiology; see AP 603.

KIN 604. Exercise and Mental Health. (3) II. Study of research and theory related to mental health consequences of physical activity. Topics will include the role of exercise in developing self-esteem and body image as well as the use of exercise as a therapy for emotional and behavioral disorders. Pr.: KIN 250, KIN 340 and KIN 345.

KIN 605. Topics in the Biological Basis of Kinesiology. (1–3) I, II. Study of a selected topic in the biological basis of kinesiology involving either an in-depth study or application of theory presented in a related course area. Pr.: KIN 250 and KIN 335.

KIN 606. Topics in the Behavioral Basis of Kinesiology. (1–3) I, II. Study of a selected topic in the behavioral basis of kinesiology involving either and in-depth study or application of theory presented in a related courses area. Pr.: KIN 250, KIN 340 and KIN 345.

KIN 625. Exercise Testing and Prescription. (3) I. Benefits and risks of exercise testing and prescription with healthy populations, individuals at risk, and patients with cardiovascular and metabolic diseases. Includes experiences with exercise test technology and methods of exercise prescription. Two hours recitation and two hours lab a week. Pr.: KIN 250, KIN 335, KIN 336 and proof of current CPR, BLS, and First Aid certification.

KIN 630. Design and Analysis of Exercise and Sport Equipment. (3) II. Design and analysis of equipment used in selected sports and equipment used in both resistive and aerobic exercise. Relevant biomechanical and physiological principles will be reviewed and applied to evaluate the quality and effectiveness of equipment now available on the open market and to consider potential improvements in design. Three hours rec. a week. Pr.: KIN 250, KIN 330 and KIN 335.

KIN 635. Nutrition and Exercise. (3) II. The interrelationships between diet, nutrition, and exercise. Topics covered include physical fitness, weight control, nutrient metabolism during exercise, and athletic performance. Pr.: KIN 250, KIN 335 and FN 132 or FN 400. Cross-listed with Foods and Nutrition; see FN 635.

KIN 650. The Development of Motor Control. (3) I, II. A multi-level analysis of the neurophysiological activation of muscle, reflexes, sensory integration during movement, and theories of voluntary movement. Two hours lecture and two hours lab a week. Pr.: KIN 250 and BIOL 240.

KIN 655. Fitness Promotion. (3) II. The study of the implementation and promotion of preventative health programs for populations at worksites, hospitals, and community fitness settings. Pr.: KIN 250 and KIN 335.

KIN 657. Therapeutic Use of Exercise in the Treatment of Disease. (3) II. Analysis of pathophysiology associated with a number of different diseases and the impact on exercise performance as well as the use of exercise as a therapeutic modality. Pr.: KIN 250 and KIN 335.

KIN 700. Physical Culture in the Western World. (3) I. A seminar on selected topics in the historical and philosophical foundations of physical culture in western civilization. Pr.: Three hours of Western Heritage.

KIN 703. Minority Groups in Sport. (3) The contributions by, problems of, and discrimination against minority groups in sports. Pr.: KIN 250 and KIN 340.

KIN 718. Cinematographic and Videographic Analysis of Human Movement. (3) On sufficient demand. Techniques and instrumentation for the analysis of overt human movement using film, videotape, and other imaging techniques. Pr.: KIN 250 and KIN 330.

KIN 792. Internship in Exercise Science. (6–8) I, II, S. Supervised field experience for the exercise science major in training settings such as YMCA, YWCA, municipal recreation agency, or industrial fitness agency. May be completed with half-time assignment for 12–16 weeks or full-time assignment for 6–8 weeks. Pr.: KIN 655.

KIN 796. Topics in Kinesiology. (1–4) On sufficient demand. Intensive study of a selected topic in kinesiology involving either greater in-depth study, or application of theory presented in a related course. May be repeated as topic varies. Pr.: 6 hours in kinesiology 500 and above. Only 6 hours may be counted toward degree. Cross-listed with Anatomy and Physiology. See AP 796.

Graduate credit

KIN 800. Advanced Physiology of Exercise. (3) II. An in-depth study of the physiological responses of the human body during exercise, the adaptations that occur with exercise training, and the laboratory techniques to assess these responses and adaptations. Pr.: KIN 335. Cross-listed with Anatomy and Physiology. See AP 800.

KIN 805. Sport and Human Behavior. (3) I. A study of the state of the sport performer and the effects of sport on human behavior. Pr.: KIN 340 or 9 hours of graduate credit in psychology (500 level or above).

KIN 806. Motor Development. (3) On sufficient demand. A study of psychomotor development. The focus is on the growth years, though developmental considerations for all age groups are considered. Implications for sport, exercise, and physical activity are discussed. Pr.: KIN 320.

KIN 807. Motor Learning and Control. (3) I. Application of learning principles to skill acquisition in sport and human domain; and practical applications. Pr.: KIN 320 or 9 hours of graduate credit in psychology (500 level or above).

KIN 808. Advanced Issues in Sport Sociology. (3) II. An in-depth analysis of the sociology of sport literature with special interest in critiquing the theoretical frameworks and methodologies employed. Pr.: KIN 340 or SOCIO 435.

KIN 815. Research Methods in Kinesiology. (3) I. A study of techniques of the research process including the identification of a research problem, the design of experimental and non-experimental strategies, and the presentation of written research.

KIN 825. Mechanical Analysis of Human Movement. (3) II. Mechanical principles and analysis procedures for the study of overt human movement. Applications to movements in exercise, sport, occupational, and daily living activities will be emphasized. Pr.: KIN 330.

KIN 830. The Child in Sport. (3) On sufficient demand. Factors prompting children's entry into sports and the consequences of participation in organized sports for children. Pr.: KIN 320 or EDAF 215.

KIN 896. Independent Study in Kinesiology. (1–4) I, II, S. Intensive independent study in a topic or problem involving the integration, application, and synthesis of theory presented in a related course. The course culminates in the preparation of an original paper. Pr.: KIN 815 and related graduate subject core courses.

KIN 897. Research in Kinesiology. (1–4) I, II, S. Independent study in one or more of the research processes involved in the scientific method. Pr.: STAT 702 or 703, KIN 815, and related graduate subject core course.

KIN 898. Master's Report. (1–4)

KIN 899. Master's Thesis. (1–6)

For more information

For additional information and application materials please contact:
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Landscape Architecture

Head
Dan W. Donelin, FASLA, AICP

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Graduate faculty

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Richard H. Forsyth, MLA, Harvard University.
Timothy D. Keane, PhD, University of Michigan.
Dennis L. Law, MLA, Kansas State University.
Lane Marshall, MLA, University of Illinois.
Robert L. Page, MLA, Harvard University.
Stephanie A. Rolley, MCP, Massachusetts Institute of Technology.
LaBarbara James Wigfall, MCRP, Harvard University.
William P. Winslow, III, MLA, University of Michigan.

The Department of Landscape Architecture/Regional and Community Planning offers professional bachelor and master of landscape architecture degrees and a master of regional and community planning degree. All three programs are accredited by their respective professional accrediting agencies. Also available is a 30-hour master of art degree in environmental planning and management through the Division of Continuing Education. Graduates of the programs are in demand throughout the country in private practice, governmental service, and academic setting.

Master of landscape architecture

Landscape planning and design have been part of the curriculum at Kansas State University since 1871, being part of the required curriculum of all students in the early days of the institution. The first MLA student graduated in 1968 and the MLA program is fully accredited by the Landscape Architectural Accreditation Board of the American Society of Landscape Architects.

Our definition of advanced landscape architecture education includes development of a strong foundation of traditional knowledge and skills as well as self-motivated and defined scholarship. Throughout the program, we are committed to research as a means of learning and serving communities and individuals. Graduates of our program practice in a wide variety of natural and built environments including urban, suburban, rural, wilderness, domestic, and international. Their practice takes place in small and large firms, multi-disciplinary firms, design/build, land development, facility management, public practice, academic settings, and within other fields. Our MLA graduates provide leadership in and advocacy for stewardship of the land and the interface of people and their activities with the land. They seek long-term solutions that address land health, human dignity, and aesthetic quality for a wide variety of land use and design problems.

Program requirements

Applicants to the master of landscape architecture program have undergraduate degrees in many different fields. For this reason the faculty evaluate all applicants on an individual basis to determine the applicant's level of ability. Students may be required to undertake basic proficiency courses to ensure they have the knowledge and skills in history and theory, design, construction, planting design, and professional practice equivalent to that of our BLA program. The basic proficiency courses will vary with each individual, from none for a student with an accredited BLA degree to 46 credits for a student with no design background.

The actual MLA program of study requires all students to take several core courses and to develop an individual concentration in community and urban design or resource planning and management. The core courses are designed to fulfill several purposes. The series provides an overview of the profession of landscape architecture and explores the scope, context, and opportunities of the profession. One specific intent is to introduce students to research as a principle tool of advancement of the profession and the application of research in professional practice.

The two areas of concentration allow focused investigation of topics and issues specific to the student's interests. A minimum of 18 credit hours out of the required 34 credit hour program of study should be directed by the selected area of concentration. Students are encouraged to select their concentration electives in a way that strengthens and makes connections between their past academic experience, their future professional interests, their thesis research interests, and their advanced design experience with their concentration electives.

Admission

Application materials should be submitted for review by the Department of Landscape Architecture/Regional and Community Planning and the Graduate School.

Applications should be submitted by March 1 for the following academic year. Although preference will be given to students applying by this time, we continue to receive applications for admission until enrollment in August for the fall semester or the middle of December for spring semester enrollment. A few students begin their studies in spring semester; however, this approach usually adds an additional semester to the time necessary to complete the program because many of the required spring semester courses have prerequisite courses that are taught in fall only.

The application package should contain the following materials:

1. Completed K-State Graduate School application form.

2. Proof of having a bachelor's degree (may be noted on transcript).

3. Two official transcripts of all previous courses and grades at junior colleges, colleges, or universities. Send these directly from the registrar of the college or university to this department to the attention of the graduate director. They become part of the student's file and may not be returned.

4. A letter of intent addressed to the landscape architecture faculty, stating academic and professional objectives and reasons for wanting to enter the K-State MLA program.

5. A portfolio or collection of previous design work, landscape plans, sketches, project photos, samples of academic, or professional writing. The collection of works may be presented with photocopies, diazo prints, or other similar formats. A portfolio is not mandatory, but encouraged when the applicant's previous academic or professional experience might include such products. The portfolio will be used in conjunction with the transcripts to determine what basic professional courses might be required.

6. Three references from previous professors or employers, relative to the applicant's ability to handle graduate level work. The names and addresses of the references should be listed on the application form. Copies of the reference form are distributed with the appli-

cation. The applicant should fill out the top portion and then give the form to the reference to complete and forward directly to the graduate director.

7. A nonrefundable application fee of $30 for both domestic and international students. Please make check or money orders payable to Department of Landscape Architecture/ Regional and Community Planning. In addition, international students are required to submit a $25 nonrefundable Graduate School application fee. One check/money order may be submitted for both fees (a total of $55). International students must submit their fees in the form of an international cashier's check or money order.

8. The Graduate Record Examination is not required for application; however, if the applicant has taken the GRE, a report of that exam is requested. International applicants must submit the following additional materials:

9. Report of TOEFL Examination Score (Test of English as a Foreign Language) of 600 or above is preferred. Foreign students with a bachelor's degree from an American university are exempt from this requirement. Students may be required to complete Intensive English Program before being allowed to enroll in MLA courses.

10. Completed financial statement.

Evaluation of the applicant will not begin until all application materials and fee have been received.

Landscape architecture courses

LAR 500. Site Planning and Design. (3) I, II. Theory, principles, and elements of site planning and design. Lectures, readings, short problems, and site visits dealing with site analysis, ecological consideration, grading drainage, circulation and parking, lighting, planting design, materials and details, management and maintenance, and cost factors. Pr.: ARCH 401 or concurrent with ARCH 401.

LAR 501 and LAR 502. Landscape Architecture Seminar. (2) I, II. Required of all fourth- and fifth-year landscape architecture majors. Discussion of current trends in landscape architecture and related fields by students, faculty, and invited speakers. (Two 2-credit-hour seminars are required for a total of four hours for the BLA program.)

LAR 635. Golf Course Planning and Design. (1–4) I, II, SIS. Fundamentals of golf course planning and design, including: history, management, design, facilities, aesthetics, and technical development. Pr.: Junior standing within landscape architecture.

LAR 645. Professional Internship. (V) I, II, S. Confirmed employment in a professional physical planning office, subject to the approval of the departmental faculty, for a period of eight weeks, documented by the employer and written and oral reports by the students. Pr.: LAR 444.

LAR 646 and LAR 648. Landscape Architectural Design Studio V and VI. Design of the outdoor environment for human needs and activities; ecological considerations; project program, site selection, analysis concept, design communication, specification, construction, planting, and maintenance.

LAR 646. Landscape Architectural Design Studio V. (4) I. Twelve hours design studio a week. Pr.: LAR 442.

LAR 648. Landscape Architectural Design Studio VI. (4) II. Twelve hours design studio a week Pr.: LAR 646.

LAR 647. Landscape Construction III. (4) I. Continuation of LAR 437 to include large scale site design, road alignment, large area grading, soils and excavation methods, storm drainage, and utilities routing. Three hours lecture and five hours studio a week. Pr.: LAR 437.

LAR 652. The Small Community in the Plains States. (3) I, II, S. An overview of the diverse nature of small communities in the Plains states, with an emphasis on the forms and patterns in the existing physical environment. Instruction in various methods of survey and analysis at the regional and community-specific scales, and application of these techniques to a different community each semester. Pr.: Fourth-year standing.

LAR 660. Landscape Rehabilitation of Disturbed Lands. (3) I. Planning rehabilitation of lands disturbed by mining and construction. Review of mining procedures, ecological systems, slope rehabilitation, and revegetation techniques. Three hours lecture a week. Pr.: Junior standing.

LAR 703 and LAR 704. Landscape Architectural Design Studio VII and VIII. Design of the outdoor environment for human needs and activities; ecological considerations; project program, site selection, analysis concept, design communication, specification, construction, planting, and maintenance.

LAR 703. Landscape Architectural Design Studio VII. (5) I. Fifteen hours design studio a week. Pr.: LAR 648 and LAR 647.

LAR 704. Landscape Architectural Design Studio VIII. (5) II. Fifteen hours design studio a week. Pr.: LAR 703 and LAR 647.

LAR 709. Computer Applications in Landscape Architecture. (3) II. Introduction to computer-aided design and related applications. Basic two- and three-dimensional problem-solving design visualization and communication. Using word processing and spread sheets in the CAD environment. One hour lec. and 3 hours lab per week. Pr.: Graduate standing with operational knowledge of DOS and windows-based systems is expected.

LAR 710. Microcomputer Applications in Landscape Architecture. (3) I, II. Examination of the application of microcomputer technology in the decision-making processes in the advanced practice and research of landscape architecture. Two hours lecture and two hours lab a week. Pr.: LAR 460.

LAR 720. Public Lands and Natural Resources Law. (3) I, II. Legal aspects of land use and natural resource management on the federal public lands. A brief history of the acquisition and disposition of the public domain and a review of legal authority on the public lands are followed by an examination of key legal issues concerning the resources of water, minerals, timber, range, wildlife, recreation and wilderness. Pr.: Advanced standing.

LAR 731. Landscape Plant Field Studies I. (1) I. The study of introduced and indigenous deciduous woody trees, shrubs, vines, and herbaceous plants adapted to the northeastern Kansas region with emphasis on the identification and selection of plant materials for use in landscape design. One hour lecture and two hours outdoor lab a week. Pr.: Graduate standing.

LAR 732. Landscape Plant Field Studies II. (1) II. A continuation of LAR 731: including the study of introduced and indigenous wood conifers and broadleaf evergreens, deciduous flowering trees and shrubs, and native grasses and forbs adapted to the northeastern Kansas region with emphasis on the identification and selection of plant material for use in landscape design. One hour lecture and two hours outdoor lab a week. Pr.: LAR 731.

LAR 735. Advanced Golf Course Planning and Design. (2) I, II, S. Advanced methods and strategies of golf course and resort planning and design. One hour of lecture and three hours of lab a week. Pr.: LAR 635.

LAR 741. Problems in Landscape Architecture. (Var.) I, II, S. Specific problems and-or reports in the area of landscape architecture. Pr.: Advanced undergraduate or graduate standing.

LAR 744. Community Site Planning. (4) II. Growth and development of cities and towns; land division. Two hours lecture and six hours studio a week. Pr.: PLAN 315.

LAR 746. Urban Design Studio I. (4) I. An interdisciplinary design studio involving large-scale design; projects with extensive time implementation sequence; responses to socioeconomic, cultural, environmental, and technical needs; and implementation strategies. Design methods are applied to selected urban areas of the Midwest. Pr.: PLAN 315 or equivalent; and concurrent enrollment in PLAN 745.

LAR 748. Natural Systems and Site Analysis. (1–3) I. Plant characteristics and their application in landscape architectural design; ecological considerations of site adaptation; natural systems; comprehensive site analysis; variety in scale and scope of projects. Two hours lec and 4 hours studio a week. Pr.: Graduate standing.

LAR 749. Planting Design. (1–3) II. Preparation of planting plans and supplementary materials design to fit a variety of sites; emphasis on planting design elements, principles and implementation. Two hours lec. and 4 hours studio a week. Pr.: LAR 748.

LAR 750. Graduate Seminar in Landscape Architecture I. (3) II. Discussion of the scope of the profession and the nature of graduate study in landscape architecture as well as current issues in practice and research. Pr.: Graduate standing in the MLA program.

LAR 752. Landscape Architecture Materials and Methods. (2) I. To provide the student a basic understanding of materials and methods commonly utilized in the practice of landscape architecture as a basis to pursue subsequent land design and land construction course work. Pr.: Graduate standing.

LAR 753. Professional Practice. (3) I. Studies of conventional and newly developing methods of professional design practice. Instruction in the relationships of architects, landscape architects, interior architects, and other professionals to users, clients, construction industry, society, government, and one another. Two hours lecture and one hour recitation. Pr.: 5th-year standing.

LAR 756. Design of Parks and Recreation Areas. (3) I. Site Planning of national, state, municipal, and private parks, and specialized recreation areas. Three hours lecture a week. Pr.: Junior standing.

LAR 757. Design for Special Populations. (3) II. Design of exterior environment to accommodate the handicapped and disadvantaged individual. Pr.: Advanced undergraduate or graduate standing.

LAR 758. Land Resource Information Systems. (3) I. The understanding, collection, and application of land resource data to land planning and design. Current methods of resource inventory, ecologically oriented site analysis, and environmental impact assessment. Review of common sources for necessary information in each resource category. Two hours lecture and two hours studio a week. Pr.: Advanced undergraduate or graduate standing.

LAR 759. Landscape Resource Evaluation. (3) II. The determination of the impact of physical project design upon the natural and manmade environment. Studies of existing site conditions and projections of the effect of such projects upon the site and vicinity. Pr.: Senior or graduate standing.

LAR 760. Composite Landscape Architecture Design Studio I. (1–4) I. Landscape design including delineation, design process, design elements, small-scale design, urban design. Pr.: Graduate standing.

LAR 761. Composite Landscape Architecture Design Studio II. (1–4) II. Continuation of LAR 760: including topics such as community design, resource analysis, park and recreation design, historic preservation with consideration of aesthetic and sensory issues. Pr.: LAR 760.

LAR 762. Composite Landscape Architecture Design Studio III. (1–4) I. Continuation of LAR 761: including topics such as community design, resource analysis, park and recreation design, historic preservation with consideration of aesthetic, technical, and economic issues. Pr.: LAR 761.

LAR 763. Composite Landscape Architecture Construction I. (1–4) II. Landscape construction including topography, site planning, site layout, grading, earthwork estimating, lighting, irrigation, construction detailing, cost estimating. Pr.: LAR 762.

LAR 764. Composite Landscape Architecture Construction II. (1–4) I. A continuation of LAR 763; large area grading, road alignment, storm drainage, utilities layout and specifications, contract. Pr.: LAR 763.

LAR 765. Composite Landscape Architecture Construction III. (3) I. A continuation of LAR 764. To include large scale site design, road alignment, large area grading, storm drainage , and utilities routing. Pr.: LAR 764.

LAR 860. Advanced Planting Design. (1–4). I, II, S. Special studies in advanced planting design. Pr.: LAR 749.

LAR 870. Advanced Landscape Architecture. (3) I, II, S. Special studies and design in advanced landscape architecture. Pr.: LAR 702.

LAR 880. Advanced Landscape Architecture Construction. (1–4) I, II, S. Specialized study of large-scale landscape planning involving landscape construction and grading. Pr.: LAR 647.

LAR 898. Thesis Proposal Writing. (2) I, II, Exploration of procedures of planning, design, scheduling, organization, and management of a landscape architecture research project. Two hours lecture a week. Pr.: ARCH 725 or EDCEP 816.

LAR 899. Research in Landscape Architecture. (Var.) I, II, S. Investigations in landscape architecture and related areas, of such caliber as to form the basis for a graduate thesis. Pr.: Graduate standing in landscape architecture.

For more information

For additional information and application materials please contact:
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Robert J. Paul, Ph.D., University of Arkansas.
J. Bruce Prince, Ph.D., University of Southern California.
Chwen Sheu, Ph.D., The Ohio State University.
Diane Swanson, Ph.D., University of Pittsburgh.
William Turnley, Ph.D., University of South Carolina.

Programs

The Department of Management supports the master of business administration (MBA) and master of accountancy (MACC) degrees.

Management courses

Undergraduate and graduate credit in minor field

MANGT 520. Organizational Behavior. (3) I, II. Examination of psychological and sociological variables important in understanding individual motivation, group functioning, change, creativity, and leadership in organizations. Pr.: MANGT 420.

MANGT 521. Quantitative Management. (3) I, II. Quantitative techniques, models, and the integrative nature of management systems. Includes PERT, CPM, linear programming, and inventory models. Pr.: CIS 101,102,103 or 200 and lab, MANGT 420, MATH 205, and STAT 350.

MANGT 522. Operations Planning and Control. (3) II. Development of concepts and understanding of planning and control systems for allocating resources and scheduling activities in business firms. To guide and coordinate the flow of materials, labor inputs, and goods and services through physical productive systems. Topics include: aggregate planning, master production scheduling, production activity planning and control, operations information systems, inventory control, material requirements planning, and total quality control. Pr.: MANGT 421.

MANGT 530. Industrial and Labor Relations. (3) I. Basic course in industrial and labor relations. Broad coverage of the institution of collective bargaining and its environment, the goals and operation of labor unions, the impact of unions on management, and labor relations law. Pr.: Junior standing.

MANGT 531. Personnel and Human Resources Management. (3) I, II. The personnel program and its operational processes of manpower planning, recruiting, testing, developing, and evaluating. Analysis of the personnel department's role in the organization with emphasis on problem solving. Pr.: MANGT 420.

MANGT 535. Personnel Law. (3) I, on demand. A survey course designed to acquaint students with the broad and controlling aspects of prominent public laws which affect human resource management. Includes readings, cases, and dicta pertaining to ADA, ADEA, OSHA, Title VII, etc. Pr.: MANGT 531.

MANGT 537. Industrial Conflict Resolution. (3) On sufficient demand. Examination of causes and nature of conflict in business and between organizations. The resolution of dysfunctional conflict and management of functional conflict. Special emphasis on resolution techniques, including mediation, arbitration, negotiation, and litigation avoidance. Pr.: MANGT 530 and 630.

MANGT 540. Small Business Consulting. (3) II. In the framework of supervised field projects, student teams analyze the management programs of an actual business. Emphasis is placed on understanding operational and strategic planning problems in the context of small business. Students develop a strategic plan for the success of the business. Pr.: Junior standing or permission of the instructor.

MANGT 550. Organizational Training and Development. (3) II, on demand. The process of training and developing the human resources in organizations, which includes organizational diagnosis, needs assessment, program design, appropriate methodologies, program implementation, transfer of training, and the evaluation of program effectiveness. Current trends in the content and process of training and development activities are also examined. Pr: MANGT 520 and MANGT 531.

MANGT 595. Business Strategy. (3) I, II, S. An integration of previous courses through the study of problems in policy formulation and implementation. Cases and current topics with emphasis on strategic planning. Open only to seniors or nonbusiness graduate students. Pr.: FINAN 450, MANGT 420, and MKTG 400.

MANGT 596. Business, Government, and Society. (3) I, II, S. The interrelationships and interactions of business with the social, political, and economic institutions. The impact of changes in the external environment on business and the managerial task. Pr.: FINAN 450, MANGT 420, and MKTG 400.

Undergraduate and graduate credit

MANGT 623. Compensation Management. (3) II. An in-depth analysis of theories, research, and practices of performance appraisal and compensation systems. Includes study of the impact of economic, behavioral, legal, and political forces on compensation management. Pr.: MANGT 531.

MANGT 630. Labor Relations Law. (3) II. Detailed examination of the development and current status of labor relations law governing the private sector in interstate commerce. Topics to be discussed include antitrust prosecution of unions, injunctions, unfair labor practices, NCRR policies, employee rights, union rights, employer rights, and contract enforcement. Pr.: Junior standing.

MANGT 631. Collective Bargaining. (3) On sufficient demand. Study of the unionized labor market. The goals, strategies, and tactics of unions and management will be examined in detail. Other topics include the environment of collective bargaining, contract negotiations, administration, and enforcement. Pr.: MANGT 530; or ECON 120 and MANGT 630.

MANGT 633. Advanced Personnel Management. (3) I. On sufficient demand. An in-depth analysis of selected topics in personnel management and employment legislation including study of current research and literature. Pr.: MANGT 531.

MANGT 639. Advanced Labor Relations. (3) On sufficient demand. Research methods, model building, economics of the unionized labor markets, and the behavioral theory of negotiations will be examined in detail. Pr.: MANGT 631 or ECON 620.

MANGT 641. Management of Quality. (3) I. Development of quality as a management philosophy through the study of ideas from contemporary quality philosophies of Deming, Juran, and Taguchi. Statistical process control charting as a process and quality improvement tool and product and process design as important components of quality. Pr.: MANGT 421.

MANGT 652. Application of Theory of Constraints. (3) II, in even years. The intent of this course is to provide an overview of the application of Theory of Constraints (TOC). TOC suggests that every process or system has at least one constraint that prevents the operation from being more efficient. TOC offers methodologies that are specifically developed to identify and manage constraints to enable the operation to achieve its goals. Students will be taught the skills required for the identification and management of constraints within an operation system. Pr.: MANGT 420, MANGT 421, MANGT 521.

MANGT 653. Business Project Management. (3) I. This course provides an in-depth coverage of project management concepts and methodologies required for service and manufacturing operations. Topics to be covered include, but are not limited to: project selection and evaluation, project dynamics, motivation and evaluation of project team members, project scheduling, project budgeting, and project closure. Pr.: MANGT 420, MANGT 421.

MANGT 656. Systems Analysis. (3) I, II, S. An in-depth study of systems analysis techniques viewing information systems as an integral component of organizational strategic planning. Emphasis on systems planning, use of CASE tools, process and data modeling, quality and systems reengineering. Pr.: MANGT 367 or 366.

MANGT 661. Logistics and Service Operations Management. (3) II, in odd years. This course addresses the characteristics of logistics management and service operations management from the aspects of storage and delivery of goods to the consumer. Recognition is given to the interrelationships of operations and other functions in the process of running operations. Pr.: MANGT 421.

MANGT 666. Applications of Data Models in Business. (3) I. S. Examination of interrelationships between managers and database designers from the user's perspective. Database design strategies for the functional areas of business such as accounting, marketing, and manufacturing management with a focus on making data responsive to changing information needs and supportive or organizational plans and goals. Pr.: MANGT 367.

MANGT 670. Systems Design. (3) II. Application of fundamental concepts learned in introductory Systems Analysis Course. Focus on the application and integration of different design methodologies using CASE tools, a structured programming language, and various structured design techniques. Pr.: MANGT 656 and MANGT 666.

MANGT 676. Management of Local Area Networks. (3) I, II. Study of telecommunications and its impact on business organizations. Coverage of networking models, hardware, software, distributed systems, and standards issues. Emphasis on Local Area Networks (LANs) and hands-on project management. Pr.: MANGT 367.

MANGT 686. Data Administration. (3) I. Study of the interrelationship of organizational information systems and the databases that support managerial decision making. The analytical/programming tools used to perform the data administration function will be implemented through realistic case settings. Pr.: MANGT 656 and MANGT 666.

MANGT 690. International Management. (3) On sufficient demand. Examination of business decision parameters and strategy in a multinational context. The influence of cultural, economic, political, and social differences on decision making and the operation of American enterprises in the international environment. Pr.: FINAN 450, MANGT 420, MKTG 400, or FINAN 710.

Graduate credit

MANGT 810. Operations Management and Analysis. (3) II. The study of the role of operations systems in the provision of value for the customer. Operations systems design, capacity determination, resource requirements planning and control, theory of constraints, supply chain management, quality management and control and project management are discussed and analyzed. Pr.: STAT 351 or STAT 702.

MANGT 820. Behavioral Management Theory. (3) I, S. An in-depth analysis of the development of the behavioral bases of individual and group behavior in business, governmental, educational, and other organizations with emphasis on current research literature and applications. Pr.: Open only to students in graduate business degree or certificate programs, or with permission of instructor.

MANGT 825. Advanced Business Law. (3) II. A study of civil law as it affects commercial transactions, including corporations, partnerships, property, commercial paper, and secured transactions. Pr.: graduate student standing.

MANGT 830. Applied Managerial Computing. (3) I, S. A practical exposure to information technology as it applies to business. Emphasis will be placed on problem-solving using spreadsheet, database and HTML based information systems. Pr.: CIS 101, 102, 103.

MANGT 840. Advanced Entrepreneurship. (3) On sufficient demand. An in-depth examination of the nature of entrepreneurship including success factors, the requirements of successful new venture planning and implementation, and researching the current literature in the field. The study of new product identification, the assessment of commercial potential, and the elements of an effective business plan will be examined in detail, culminating in the preparation of a comprehensive plan for the development and marketing of a new product or service. Pr.: FINAN 815, MANGT 820, and MKTIB 890.

MANGT 860. Management of Legal, Ethical, and Public Policy Issues. (3) I, S. A study of the influence of political, economic, legal and social factors on contemporary business organizations. The course requires students to integrate concepts from core courses in order to formulate and implement strategic and ethical responses to issues posed by these environmental factors. Pr.: ACCTG 810, FINAN 815, MKTIB 810, MANGT 810, MANGT 820, MANGT 830, ECON 815, and STAT 702.

MANGT 867. Management of Information Resources. (3) II. Concepts and information resource management techniques are integrated into a conceptual framework of business computing systems. The impact of current issues and new technologies on business is emphasized through discussion and application. Topics include Internet, decision support, executive information systems, computer simulations, systems analysis and design, and implications of recent computing innovations on business. Pr.: MANGT 830.

MANGT 892. International Operations Management. (3) I. Explores the global market context and the environment for multinational operations. Examines important tools, concepts, theories, models, and structures as defined and applied to manufacturing and service operations in other countries. Emphasis is placed on Japanese technology and practices. It draws upon those aspects of manufacturing and service operations that can help U.S. firms become increasingly competitive worldwide. Pr.: MANGT 690 and 810.

MANGT 893. Management Science. (3) II, S. The application of management science methods to business problems to provide a basis for rational decision making. Includes mathematical programming, inventory theory, simulation, model building, and heuristics. Pr.: MATH 205, STAT 351 or STAT 702 (or concurrent enrollment).

MANGT 897. Topics in Management: Contemporary Issues in Management. (3) II. Discussion and analysis of contemporary issues in management, including applications, development and study of relevant literature and research findings. Pr.: MANGT 820, 810 and 830.

MANGT 898. Special Problems in Management. (Var.) As scheduled. An in-depth study of specified topics. Pr.: Twelve hours of management and consent of the instructor and department head.

For information

For additional information and application materials please contact:
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Marketing and International Business

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Swinder Janda, Ph.D., University of Arkansas.
Christopher Joiner, Ph.D., University of Minnesota.
Dawne Martin, Ph.D., University of Colorado.
Philip Trocchia, Ph.D., University of Alabama.

See Business Administration in this catalog for additional information and listing of graduate faculty.

Programs

The Department of Marketing and International Business supports the master of business administration (MBA) and master of accountancy (MACC) degrees.

Marketing and international business courses

Undergraduate and graduate credit in minor field

MKTIB 541. Retailing. (3) II. This course is designed to introduce the student to the role retailing performs in the distribution of consumer goods and services. The course will survey the retailing environment and incorporate strategic planning from the management point of view; study retail policies and organizations; merchandise control; personnel management; retail accounting and expense control. Pr.: MKTIB 400, MKTIB 450.

MKTIB 542. Sales Management. (3) II. Management of the sales force in other than retail settings. Involves hiring, screening, recruiting, training, organizing, motivating, supervising, controlling, and evaluating members of the sales force. Also focuses on the development and execution of sales strategies as well as on the mechanics and need for sales forecasting. Pr.: MKTIB 400.

MKTIB 543. Integrated Marketing Communications. (3) I, II. Focuses on the management of promotional programs which include elements of advertising, personal selling, sales promotion, and public relations. Includes a review of concepts from economics, behavioral sciences, and mathematics which play a role in creating, executing, and evaluating promotional programs. Pr.: MKTIB 400 and 450.

MKTIB 544. International Marketing. (3) I, II, S. This course deals with the problems and perspectives of marketing across national boundaries. It also focuses on the tools and practices for structuring and controlling marketing programs related to overseas business. Emphasis is on the management of marketing functions in a global context. Topics include international trade organizations, international economic factors, foreign business customs, and the international marketing mix. Pr.: MKTIB 400.

MKTIB 545. Marketing Channels. (3) I. Study of the quantitative and qualitative factors involved in selecting, developing, managing, and controlling marketing channels of distribution. Includes decision models from industrial marketers through purchasing units. Pr.: MKTIB 400.

MKTIB 546. Services Marketing. (3) I. An analysis of the unique marketing challenges faced by service organizations. Major topics include the unique characteristics of services, creating and positioning a service in the marketplace, distributing, promoting and pricing services. An evaluation of marketing strategies from the perspective of a service firm. Pr.: MKTIB 400.

MKTIB 547. International Business. (3) I. This course provides students with an appreciation of the opportunities and unique challenges in international business, an understanding of the strategic and operational options available to an international firm, and managerial decision making abilities required to be successful abroad. The course examines strategic and operational issues in management,marketing, accounting and finance from an international perspective. Pr.: MKTIB 400, ACCTG 241, MANGT 420, FINAN 450.

MKTIB 550. Business Marketing. (3) I. A study of the nature of the industrial marketplace, concentrating on those aspects that differentiate it from the consumer markets. The major topics are analysis of market needs, market segments, organizational buying behavior, purchasing agent functions and activities, marketing strategy and mix for institutional customers, not-for-profit and services marketing, and buyer/seller relationships. Pr.: MKTIB 400.

Undergraduate and graduate credit

MKTIB 642. Marketing Research. (3) I, II. Designed to acquaint the students with the marketing research literature, concepts, methods, and techniques. The emphasis in this course is on how to actually conceptualize and conduct a marketing research project as well as use research as an aid for marketing management decisions. Topics include the marketing research industry, defining the marketing research problem, research design formulation, data collection, data preparation and analysis, communicating the research project, and international and ethical dimensions of marketing research. Pr.: STAT 351, CIS 101, CIS 102, CIS 103, MKTIB 400 and MKTIB 450.

MKTIB 690. Marketing Management. (3) I, II, S. Analysis of marketing situations which lead to appropriate management of the marketing program's objectives. Capstone course integrates knowledge of marketing and other business management principles into marketing strategy, development, implementation, and control. Pr.: MKTIB 642 or concurrent enrollment.

MKTIB 810. Marketing Concepts and Research. (3) II. Presents marketing concepts and marketing research concepts at the graduate level. Emphasis is directed toward managerial strategy development using marketing theories and applied marketing research techniques. Pr.: Three hours of economics, three hours of statistics, and MATH 205 or 220.

MKTIB 842. Advanced Marketing Research. (3) I, In odd years on sufficient demand. Application of advanced research methods to help solve marketing problems. Intensive examination of experimental and survey designs, data collection methods, and selected multivariate analysis techniques are covered. Pr.: STAT 351, MKTIB 640, and MKTIB 642.

MKTIB 844. Advanced International Marketing. (3) II. This course is designed to develop the students' managerial decision making ability in international marketing. The course will focus on the internationalization process of firms, the unique issues in international marketing, and international marketing strategy. The course will integrate short lectures, class discussions, and case analysis to achieve its objectives. Pr.: MKTIB 810.

MKTIB 860. Advanced International Business. (3) I. This course is designed to introduce the student to the nature and scope of fundamental business skills requisite for a career in international business. A unified survey of the international aspects of accounting, finance, management, marketing and related subjects will be made that is useful to a manager in a global business enterprise. Emphasis will be placed on the identification, articulation and implementation of successful global strategies. Pr.: ACCTG 810, ECON 815, FINAN 815, MANGT 820, MANGT 810, MANGT 830, MKTIB 810, and STAT 702 or enrollment in the MAcc program.

MKTIB 891. Special Topics in Marketing. (3) II, in even years on sufficient demand. Investigation and discussion of a selected topic in marketing. One of the following five topics will be chosen for intensive study: (1) industrial marketing management, (2) advanced consumer behavior, (3) product policy, (4) financial aspects of marketing management, (5) marketing in the service sector. Pr.: MKTIB 810 or 6 hours of marketing.

For more information

Marketing and international business home page: http://www.cba.ksu.edu/cba/depart/market/default.htm

Business administration home page: http://www.cba.ksu.edu/cba/

Mass Communications

Director
Todd Simon

Director of graduate studies
Paul Prince

Graduate faculty
William Adams, Ph.D., Indiana University.
Lori Bergen, Ph.D., Indiana University.
Kristina Boone, Ph.D., Ohio State University.
Tom Grimes, Ph.D., Indiana University.
Janice R. Hume, Ph.D. University of Missouri.
Charles Lubbers, Ph.D., University of Nebraska.
David MacFarland, Ph.D., University of Wisconsin.
Robert Meeds, Ph.D., University of Missouri.
Carol E. Oukrop, Ph.D., University of Iowa.
Paul Parsons, Ph.D., University of Tennessee.
R. Charles Pearce, Ph.D., University of Tennessee.
Paul Prince, Ph.D., University of Utah.
Todd F. Simon, LL.M., The George Washington University.

The program

The A.Q. Miller School of Journalism and Mass Communications offers a master of science in mass communication. The degree program requires a core of mass communication research and theory classes and an adviser-approved emphasis from the school's graduate-level coursework. The courses in each emphasis encourage students to apply the core concepts and to prepare for careers in the mass media and teaching professions. Hands-on opportunities on campus for developing skills and for research include the student-run *Collegian* newspaper, KSDB-FM, the university's television production center, and the Huck Boyd National Center for Community Media.

Requirements

30 graduate semester hours, distributed as follows:

MC 765 Communication Theory
MC 780 Research Methods
MC 850 Applied Research in Mass Media
Three 700-level electives in MC
Thesis or report
Graduate electives in the area of specialization to complete 30 semester hours

Master's degree candidates who write "reports" instead of theses must pass a written comprehensive examination covering research and theory. All students must receive grades of A or B in law, history and ethics or take comprehensive exam(s). All candidates deliver a final oral defense of their theses or reports.

Admission to the master's degree program requires an undergraduate degree from a four-year college or university, with basic undergraduate course work in journalism and mass communications. Provisional admission may be granted to applicants entering the degree program with no previous course work in mass communications, with the requirement to take basic undergraduate courses along with the graduate course work. Also required are satisfactory scores on the GRE and an undergraduate GPA of 3.0 or above on the final 60 hours of course work. For international students, a TOEFL score of 600 is required.

Financial support

The school has a limited number of paid teaching assistantships, renewable nine-month appointments, 20 hours per week during the regular semester. Stipends vary but are usually $7,000 for nine months. Academic year tuition is waived during the academic year for a student holding a .4 GTA appointment. GTAs perform various tasks from monitoring basic media labs to assisting professors with grading. Preference is given to applicants with academic and/or professional media experience. Application for assistantship is by letter, with resume and samples of professional work, addressed to Todd Simon, Director, A.Q. Miller School of Journalism and Mass Communications, Kansas State University, 105 Kedzie Hall, Manhattan, Kansas 66506–1501.

Career opportunities

Students seek a master's degree for various reasons. Some students are in mid-career and want the degree for advancement or to change career direction. Other students, upon completing the undergraduate degrees, join us to gain additional skills and insights into specific media so as to be better prepared for the start of their careers. Others enroll as a step toward the Ph.D. and an academic career.

Mass communications courses

Undergraduate and graduate credit in minor field

MC 500. Advanced News and Feature Writing. (3) Intensive course emphasizing reporortial principles and practices. Students serve as reporters for the *Kansas State Collegian*, writing for an audience of 20,000 readers daily. Pr.: MC 440 with grade of C or better.

MC 505. Electronic News Reporting. (3) Practical experience in gathering, writing, editing, producing, and presenting news for the electronic media, and study of related issues. Pr.: MC 500 with grade of C or better.

MC 510. Yearbook Editing and Management. (2) Planning, editing, layout, writing, and financing a publication.

MC 520. Newspaper Advertising Sales. (3) Basics of retail advertising, applied to newspapers including sales, design, copy writing, production, budgeting, and legal and ethical issues. Pr.: MC 320 with grade of C or better.

MC 525. Electronic Media Advertising Sales. (3) Retail advertising applied to broadcast and cable. Campaigns, media buying, and sales techniques. Pr.: MC 320 or MKTG 400 with grade of C or better.

MC 530. Media, Race, and Social Change. (3) Examines how the media cover special change, particiularly racial issues, and studies the development and current status of the ethnic media in the United States. Pr.: Junior standing.

MC 535. Photojournalism. (1–3) I. The materials, principles, and processes of photography directed toward visual reporting in newspapers, magazines, and other media. Content and credit vary. Potential topics include documentary picture story, essay, and sequence; spot news, feature, and sports photography; combining words and pictures effectively; marketing techniques; legal restrictions. Lectures, demonstrations, and laboratory. Pr.: MC 400 and 430 with grades of C or better.

MC 540. Advanced Editing and Design. (3) Advanced study of the editing processes with emphasis on handling the story writing, headlines, and use of all elements for packaging the news. Pr.: MC 500 with grade of C or better.

MC 545. Advertising Media Planning. (3) The selecting, scheduling, selling, and buying of the various advertising media. Pr.: MC 420 grade of C or better.

MC 550. Mass Communications Internship. (1–3) The student works in a professional capacity under proper professional and faculty supervision with reports from student and supervisor required. Pr.: Twelve semester hours of MC courses and consent of instructor. Print Journalism—Pr.: MC 500; Electronic Journalism—Pr.: MC 505; Public

Relations—Pr.: MC 635; Advertising—Pr.: MC 555; Radio–TV Production—Pr.: MC 570 , 575, or 580; Radio–TV sales or promotion—Pr.: MC 475 and either MC 525 or MC 655 or MC 685.

MC 555. Advertising Techniques. (3) The planning, creation, and production of advertising messages for the various mass communication media. Pr.: MC 420 with grade of C or better.

MC 560. Non-Traditional Press. (3) A study of the changing journalistic attitudes toward objectivity in the 1960s and since. Examination of the resulting resurgence and development of alternative, minority, underground, and counterculture media. Techniques, style, impact, use, and consequences to the media and society of the new journalism will be analyzed.

MC 565. Law of Mass Communications. (3) A study of legal issues relating to mass communications. Emphasis on defamation, privacy, copyright, administrative controls, and other areas related to the mass media.

MC 570. Audio Techniques. (3) Theory and practice of radio remotes, automation and multichannel recording and editing in the production of commercials, dramatic narrative, and documentary programs. Pr.: MC 475 with grade of C or better.

MC 575. Multimedia Techniques. (3) Theory and practice of multimedia mass communication, with an emphasis on preproduction planning, authoring, and development of computer-based audio, video and graphic materials. Pr.: MC 475, MC 500, MC 555, or MC 635 with grade of C or better.

MC 580. Video Techniques. (3) Theory and practice of electronic field production, video editing, and video for multimedia. Pr.: MC 475 with grade of C or better.

MC 585. Advanced Electronic News Reporting. (3) Reporting of issues of local importance, information-gathering techniques, in-depth writing, and electronic media news production methods. Pr.: MC 505 with grade of C or better.

MC 595. Mass Communication Research. (3) Formulation of mass communication research and design. Appropriate methods of data collection and data analysis. Pr.: MC 235 and completion of a mathematics or statistics course.

Undergraduate and graduate credit

MC 600. Public Affairs Reporting. (3) Investigative reporting of local, state, and national affairs. Pr.: MC 500.

MC 605. Supervision of School Publications. (3) A methods course for those planning to teach secondary or community college journalism courses and advise high school or community college publications.

MC 612. Gender Issues and the Media. (3) The portrayal of women and men by the media, and media employment issues based on gender. Pr.: One course in MC or women's studies.

MC 615. Magazine Article Writing. (3) Preparation of feature stories and articles; techniques of market analysis, and marketing of articles written in course. Pr.: MC 500.

MC 620. Magazine Production. (3) The practical application of theory to writing, editing, graphic reproduction, layout, and management of magazines. Pr.: MC 500.

MC 630. Public Relations Case Studies. (3) Study of historic and contemporary public relations situations using a case-method approach. Attention is directed at strategic planning and implementation by public relations managers. Students establish criteria on what constitutes a public relations program and theories and norms for the selection of objectives and strategies under varying conditions. Pr.: MC 325.

MC 635. Public Relations Techniques. (3) Focuses on the use of communication techniques in achieving organizational goals. Includes planning, application and ethics of messages for print, electronic and on-line media and for special events. Pr.: MC 325 and 445 with grades of C or better.

MC 640. Advertising Campaigns. (3) The managerial development and execution of consumer, industrial, and institutional advertising campaigns. Pr.: MC 545, 555, and 595.

MC 645. Public Relations Campaigns. (3) Advanced study of an organization's public relations needs. Includes researching the situation, analyzing audiences, and preparing strategic plans for approved clients. Pr.: MC 595, 635, and completion of at least one course in social science methods or data analysis.

MC 650. Newspaper Management. (3) The management of newspapers dealing with organization, ownership, promotion, research, production, equipment, markets, personnel, legal aspects, advertising, buying and selling of newspaper properties, business practices, and news policy.

MC 655. Electronic Media Programming. (3) The principles, planning, and development of radio-television-cable programs, schedules and related regulation. Pr.: MC 410.

MC 670. Advertising and Social Responsibility. (3) II. Examines social, ethical and legal issues and problems facing the advertising industry, and its relationship with the consumer.

MC 680. Readings in Mass Communications. (1–3) Investigation of the literature of mass communications. Three significant books per credit hour with written analysis and oral presentation. Pr.: Minimum of nine hours of completed coursework in MC and consent of supervisory instructor.

MC 685. Electronic Media Management. (3) Management practices of broadcast, cable, and nonbroadcast facilities including regulation and sales. Pr.: MANGT 420 or MC 410.

MC 690. Problems in Mass Communications. (1–4) Pr.: Background of courses needed for problem undertaken.

MC 700. Propaganda and Mass Communications. (3) History, theory, development, and impact of propaganda as a controversial mass communication strategy that influences public opinion.

MC 705. Fund Raising by Non-Profit Organizations. (3) I. Theory and practice of fund raising as a function of public relations in non-profit organizations. Focuses on why or how people give to philanthropic causes.

MC 710. History of Journalism. (3) Growth and development of the news media in the United States and their economic, political, and social significance. Pr.: A U.S. history course.

MC 715. History of the Electronic Media. (3) Growth and development of the electronic media in the United States and their economic, political, and social significance. Pr.: A U.S. history course.

MC 720. Ethics in Mass Communications. (3) Moral analysis, argument, and decisionmaking by the mass communicator, with linkage of ethics to the conduct of media professionals in the United States. Pr.: A philosophy course.

MC 725. International Communications. (3) Comparative study of world media systems and the role of mass communications in national development.

MC 730. Seminar in the Future of the Media. (3) A study of philosophical and technological advances in mass communications with emphasis on projected patterns of future growth and development.

MC 740. Colloquium in Mass Communications. (1–3) Discussion of selected topics in mass communications research and practice. May be repeated for credit when topic varies.

MC 765. Communication Theory. (3) An examination of major communication theories as they relate to individual, interpersonal, group, and mass communications.

MC 770. Professional Journalism Practicum. (1–4) For advanced students. Supervised practical work in professional journalism and mass communications. Includes laboratory investigation, field work, and internships. Pr.: Consent of supervising instructor.

MC 780. Research Methods in Mass Communications. (3) Survey of research methods used in the study of the mass media.

Graduate credit

MC 850. Applied Research in Mass Media. (3) Study and application of mass media research, its literature, and methodology. Pr.: MC 780.

MC 865. Seminar in Mass Communication Law. (3) Analysis of mass communication freedoms and limitations in such areas as defamation, privacy, copyright, censorship, obscenity, and advertising and electronic media regulation. Pr.: Graduate standing.

MC 899. Research in Mass Communications. (Var.) Thesis/report credit. Pr.: Sufficient training to carry on the line of research undertaken.

For more information

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Louis Pigno, Ph.D., State University of New York, Stony Brook.

Pietro Poggi-Corradini, Ph.D., University of Washington.

Alexander G. Ramm, D. Sci., Mathematics Institute Academy of Science, Minsk.

Sadahiro Saeki, D.Sc., Tokyo Metropolitan University.

Ernest E. Shult, Ph.D., University of Illinois.

Brent P. Smith, Ph.D., Louisiana State University.

Yan Soibelman, Ph.D., Rostov University.

George E. Strecker, Ph.D., Tulane University.

David B. Surowski, Ph.D., University of Arizona.

David Vaninsky, Ph.D., University of Pennsylvania.
Kirill Vaninsky, Ph.D., New York University.
Huanan Yang, Ph.D., University of California, Los Angeles.
Qisu Zou, Ph.D., Brown University.

Overview

The Department of Mathematics offers programs of study leading to the master of science and doctor of philosophy degrees. There are over 50 graduate students in the master's and Ph.D. programs; in addition to American students, there is also a large number of European, Middle Eastern, and Asian students, thus lending a truly international flavor to the academic environment in the department. Financial assistance is available on a competitive basis to well-qualified applicants in the form of graduate teaching assistantships and graduate research assistantships; in addition, there are graduate student fellowships and GTA stipend supplements available through the Graduate School on a competitive basis.

Research areas and facilities

The Department of Mathematics has internationally recognized programs in harmonic analysis, operator theory, quantum topology, representation theory, group theory and finite geometries, and applied mathematics. The applied mathematics group is active in computational fluid dynamics, wave propagation, reaction-diffusion equations, as well as in numerical analysis. There are also robust research groups in categorical and point-set topology, geometry of manifolds, analytic number theory, and probabilistic harmonic analysis.

Kansas State University provides excellent facilities for mathematical research. The university libraries have extensive holdings in the mathematical sciences and a separate Math/Physics branch library is available in the same building as the Department of Mathematics. Even obscure publications are available through the Linda Hall Science Library in Kansas City through interlibrary loan. K-State provides a modern computer environment with access to major mathematical software packages (Mathematica, Matlab, etc.) and full internet access. The Department of Mathematics also has its own state-of-the-art network of workstations and PC's used for both teaching and research.

Admission

In most cases an applicant to the master's program should have completed work in mathematics equivalent to that required for a bachelor's degree at Kansas State University, whereas applicants to the Ph.D. program will have normally completed the equivalent of a master's degree in an accredited program. While there are no formal application deadlines, international applicants residing outside the U.S. or Canada should have their application materials in by April 1 to be guaranteed consideration for the fall semester of the same year.

Master of science degree

There are three distinct master's degree options recognized by both the department and the Graduate School: master's thesis; master's report; and the nonthesis, nonreport option. In general terms, the master's thesis option is best suited for the student seeking the master's degree as the terminal degree. The master's report generally is shorter than the master's thesis, but in principle is closer in format and spirit of creativity to published works in mathematics than is the master's thesis, which tends to be more expository in nature. The nonthesis, nonreport option is generally best suited for students wishing to continue into the Ph.D. program in mathematics. Here, instead of defending a thesis or a report, the student will pass a written exam, administered by the student's master's committee. In all cases, the graduate student must include at least 30 credit hours of mathematics at the 700 level or above on the program of study, which is composed in consultation with the student's supervisory committee.

There is no language requirement for the master's degree.

Doctor of philosophy

The basic requirements for the Ph.D. degree in the Department of Mathematics include:

At least 90 credit hours of mathematics, all at the 700 level and above, of which at least 24 credit hours are taken in residence at Kansas State University, and which includes at least 30 credit hours of MATH 999. A master's degree from a reputable graduate program in mathematics can be used in lieu of 30 credit hours in mathematics.

Passing the qualifying exam.

Passing the preliminary exam.

Demonstrating reading proficiency of mathematical exposition in French, German, or Russian.

Writing and defending the Ph.D. dissertation.

It is the department's philosophy that the qualifying examination tests the student's mathematical breadth, whereas the preliminary examination tests the student's depth.

After passing the qualifying exam, the graduate student will, within one year, select a thesis advisor and form the Ph.D. supervisory committee. This committee is responsible for administering the preliminary examination, which tests the student's mathematical depth, and therefore his or her readiness to undertake serious mathematical research. The Ph.D. dissertation resulting from the student's independent and original research naturally represents the successful conclusion of the time spent as a graduate student. The student's supervisory committee will schedule a public defense of the dissertation, during which the student will defend not only the mathematical correctness of the work, but also its originality and importance.

Mathematics courses

MATH 506. Introduction to Number Theory. (3) II. Divisibility properties of integers, prime numbers, congruences, multiplicative functions. Pr.: MATH 221.

MATH 510. Discrete Mathematics. (3) I, II, S. Combinatorics and graph theory. Topics selected from counting principles, permutations and combinations, the inclusion-exclusion principle, recurrence relations, trees, graph coloring, Eulerian and Hamiltonian circuits, block designs, and Ramsey Theory. Pr.: Sophomore standing and MATH 221.

MATH 511. Introduction to Algebraic Systems. (3) I. Properties of groups, rings, domains and fields. Examples selected from subsystems of the complex numbers, elementary number theory, and solving equations. Pr.: MATH 222.

MATH 512. Introduction to Modern Algebra. (3) I, II. Introduction to the basic algebraic systems, viz., groups, rings, integral domains, and fields, often drawing from elementary number theory. Special emphasis will be given to methods of theorem proving. Pr.: MATH 222 or consent of instructor.

MATH 515. Introduction to Linear Algebra. (2–3) II. Finite dimensional vector spaces, linear transformations and their matrix representations, dual spaces, invariant subspaces, Euclidean and unitary spaces, solution spaces for systems of linear equations. Pr.: MATH 512.

MATH 520. Foundations of Analysis. (3) A study of sets and sequences, neighborhoods, limit points, convergence, open and closed sets in the real line and in the plane, the concept of a continuous function. Pr.: MATH 222.

MATH 521. The Real Number System. (3) An extensive development of number systems, with emphasis upon structure. Includes systems of natural numbers, integers, rational numbers, and real numbers. Pr.: MATH 221.

MATH 540. Advanced Ordinary Differential Equations. (3) First-order scalar equations: geometry of integral curves, symmetries and exactly soluble equations; existence, uniqueness and dependence on parameters with examples. Systems of first-order equations, Hamilton's equations and classical mechanics, completely integrable systems. Higher-order equations. Initial value problems for second order linear equations, series solutions and special functions. Boundary value problems with applications. Introduction to perturbation theory and stability. Pr.: MATH 240.

MATH 551. Applied Matrix Theory. (3) I, II. Matrix algebra, solutions to systems of linear equations, determinants, vector spaces, linear transformations, eigenvalues, linear programming, approximation techniques. Pr.: MATH 205 or 220.

MATH 560. Introduction to Topology. (3) An introduction to the basic topological concepts. Topological spaces, metric spaces, closure, interior, and frontier operators, subspaces, separation and countability properties, bases, subbases, convergence, continuity, homeomorphisms, compactness, connectedness, quotients and products. The course will include a brief introduction to proof techniques and set theory. Other topics in topology also may be included. Pr.: MATH 222.

MATH 570. History of Mathematics. (3) II. A survey of the development of mathematics from ancient to modern times. Cannot be used a part of the advanced mathematics needed for the B.S. degree in mathematics. Pr.: MATH 221.

MATH 572. Foundations of Geometry. (3) Euclidean, non-Euclidean, and finite geometries; role of axioms; practice proving theorems in a formal system; synthetic, metric, and transformation approaches to Euclidean geometry. Pr.: MATH 221.

MATH 591. Topics in Mathematics for Teachers. (1–3) I, II, S. Topics of importance for teachers of mathematics. May be repeated for credit. Pr.: Consent of instructor.

MATH 615. Advanced Engineering Mathematics I. (3) I. Vector calculus; higher-dimensional calculus; topics in ordinary differential equations; complex analysis. Pr.: MATH 240 and 551.

MATH 616. Advanced Engineering Mathematics II. (3) II. Fourier series; Fourier and Laplace transforms; basic partial differential equations; basic calculus of variations. Pr.: MATH 240 and 615.

MATH 630. Introduction to Complex Analysis. (3) I, II. Complex analytic functions and power series, complex integrals. Taylor and Laurent expansions, residues, Laplace transformations, and the inversion integral. Pr.: MATH 240.

MATH 632. Elementary Partial Differential Equations. (3) I. Orthogonal functions, Fourier series, boundary value problems in partial differential equations. Pr.: MATH 240.

MATH 633. Advanced Calculus I. (3) I. Functions of one variable; limits, continuity, differentiability, Riemann-Stieltjes integral, sequences, series, power series, improper integrals. Pr.: MATH 222.

MATH 634. Advanced Calculus II. (3) II. Functions of several variables; partial differentiation and implicit function theorems, curvilinear coordinates, differential geometry of curves and surfaces, vectors and vector fields, line and surface integrals, double and triple integrals, Green's Theorem, Stokes' Theorem, and Divergence Theorem. Pr.: MATH 633.

MATH 655. Elementary Numerical Analysis I. (3) I. Error analysis, root finding, interpolation, approximation of functions, numerical integration and differentiation, systems of linear equations. Pr.: MATH 221, a computer language, and either MATH 515 or 551.

MATH 656. Elementary Numerical Analysis II. (3) II. A continuation of MATH 655. Linear programming, numerical solutions of differential equations, and the use of standard packages for the solutions of applied problems. Pr.: MATH 655 and 240.

MATH 670. Mathematical Modeling. (3) Introduction of modeling procedures. Case studies in mathematical modeling projects from physical, biological, and social sciences. Pr.: Four mathematics courses numbered 500 or above.

Graduate credit

MATH 700. Set Theory and Logic. (3) An introduction to logic, mathematical proof, and elementary set theory. Topics include elementary logic, relations, partitions, functions, cartesian products, disjoint unions, orders, construction of the natural numbers, ordinal and cardinal numbers, the Axiom of Choice, and transfinite induction. Special emphasis will be given to proving theorems.

MATH 701. Elementary Topology I. (3) I. Introduction to axiomatic topology including a study of compactness, connectedness, local properties, separation axioms, and metrizability. Pr.: Math 633.

MATH 702. Elementary Topology II. (3) Path connectedness, fundamental groups, covering spaces, introduction to topological and differentiable manifolds. Pr.: MATH 701.

MATH 704. Introduction to the Theory of Groups. Introduction to abstract group theory, permutation groups, homomorphisms, direct products, Abelian groups. Jordan-Holder and Sylow theorems. Pr.: MATH 512.

MATH 706. Theory of Numbers. (3) II. Divisibility, congruences, multiplicative functions, number theory from an algebraic viewpoint, quadratic reciprocity, Diophantine equations, prime numbers. Pr.: MATH 221 and either 511 or 512.

MATH 710. Introduction to Category Theory. (3) Categories, duality, special morphisms, functors, natural transformations, limits and colimits, adjoint situations, and applications. Pr.: MATH 701 and MATH 730.

MATH 711. Category Theory. (3) Set-valued functors and concrete categories, factorization structures, algebraic and topological functors, categorical completions, Abelian categories. Pr.: MATH 710.

MATH 713. Advanced Applied Matrix Theory. (3) II. A development of the concepts of eigenvalues by considering applications in differential equations, quadratic forms and estimation problems. Supporting topics include the Jordan canonical form, functions of matrices, vector and matrix norms, convex sets, with selected topics from the theory and application of the simplex algorithm, Markov chains, Leslie population models, Leontieff input-output model. Pr.: MATH 551 or 603.

MATH 721. Analysis I. (3) I, II, S. Metric spaces, limits, continuity, sequences and series, connectedness, compactness, Baire category, uniform convergence, theorems of Stone-Weierstrass and Arzela. Pr.: MATH 240 or graduate standing.

MATH 722. Analysis II. (3) II. Lebesgue and Riemann-Stieltjes integration on the real line, differentiation on the real line, elementary transcendental functions. Pr.: MATH 721.

MATH 730. Abstract Algebra I. (3) Groups, rings, fields, vector spaces and their homomorphisms. Elementary Galois theory and decomposition theorems for linear transformations on a finite dimensional vector space. Pr.: MATH 512 or consent of instructor.

MATH 731 Abstract Algebra II. (3) II. Continuation of MATH 730. Pr.: MATH 730 or consent of instructor.

MATH 740. Calculus of Variation. (3) On sufficient demand. Necessary conditions and the Euler-Lagrange equations. Hamilton-Jacobi theory, Noether's theorems, direct methods, applications to geometry and physics. Pr.: MATH 722 or equivalent.

MATH 745. Ordinary Differential Equations. (3) I. First-order equations and applications, second-order equations and oscillation theorems, series solutions and special functions, Sturm Liouville problems, linear systems, autonomous systems and phase plane analysis, stability, Liapunov's method, periodic solutions, perturbation and asymptotic methods, existence and uniqueness theorems. Pr.: MATH 240

MATH 755. Dynamic Modeling Processes. (3) Topics to include equilibrium and stability, limit circles, reaction-diffusion, and shock phenomena, Hopf bifurcation and cusp catastrophes, chaos and strange attractors, bang-bang principle. Applications from physical and biological sciences and engineering. Pr.: MATH 240 and 551.

MATH 757. Mathematical Control Theory. (3) Mathematical analysis of dynamical systems governed by differential equations and their optimal processes, feedback, and filtering. Topics include: dynamical systems with controls, axioms of control systems, input-output behaviours, stability and instability, reachability and controllability, dynamic feedback and stabilization, optimal control processes, piecewise constant control and bang-bang principle, Pontryagin maximum principle, tracking, and filtering. Pr.: MATH 560 and MATH 615.

MATH 760. Probability Theory. (3) An introduction to the mathematical theory of probability. Material covered includes combinatorial probability, random variables, independence, expectations, limit theorems, Markov chains, random walks, and martingales. Pr.: MATH 633 and STAT 510.

MATH 772. Elementary Differential Geometry. (3) Curves and surfaces in Euclidean spaces, differential forms and exterior differentiation, differential invariants and frame fields, uniqueness theorems for curves and surfaces, geodesics, introduction to Riemannian geometry, some global theorems, minimal surfaces. Pr.: MATH 240.

MATH 789. Combinatorial Analysis. (3) II, in alternate years. Permutations, combinations, inversion formulas, generating functions, partitions, finite geometries, difference sets, and other topics. Pr.: MATH 512.

MATH 791. Topics in Mathematics for Secondary School Teachers. (3) Topics of importance in the preparation of secondary school teachers to teach modern mathematics. May be repeated for credit.

MATH 801. Numerical Solution of Differential Equations I. (3) I. Single and multistep methods for initial-value problems for ordinary differential equations; discretization and round-off error; consistency, convergence, and stability of these methods; stiff equations and implicit methods; two-point boundary value problems; initial and boundary-value problems for partial differential equations; finite difference methods; marching schemes for parabolic and hyperbolic problems; consistency, stability, convergence, and the Lax equivalence theorem; treatment of boundary conditions; boundary-value problems for elliptic equations; relaxation, alternating direction, and strongly-implicit iterative methods; nonlinear problems; finite element methods. Pr.: MATH 655 and knowledge of a programming language.

MATH 802. Numerical Solution of Differential Equations II. (3) II. Continuation of MATH 801. Pr.: MATH 801.

MATH 810. Higher Algebra I. (3) Theory of groups, theory of rings and ideals, polynomial domains, theory of fields and their extensions. Pr.: MATH 731.

MATH 811. Higher Algebra II. (3) Continuation of MATH 810. Pr.: MATH 810.

MATH 821. Real Analysis I. (3) I. Measurability, integration theory, regular Borel measures, the Riesz representation theorem, and Lebesgue measure in Euclidean spaces. Pr.: MATH 722.

MATH 822. Real Analysis II. (3) The Lp-spaces, Banach spaces, and Hilbert spaces, complex measures and the Radon-Nikodym theorem, the Fubini theorem on double integration, and differentiation. Pr.: MATH 821.

MATH 825. Complex Analysis I. (3) I. Holomorphic functions, harmonic functions, the Cauchy integral theorem, normal families and the Riemann mapping theorem, and the Mittag-Leffler theorem. Pr.: MATH 822 or consent of department.

MATH 826. Complex Analysis II. (3) II. Analytic continuation, the Picard theorem, Hp-spaces, elementary theory of Banach algebra, the theory of Fourier transforms, and the Paley-Wiener theorems. Pr.: MATH 825.

MATH 840. Differential Equations I. (3) I. Basic ordinary and partial differential equations. First-order ordinary differential equations: symmetries and solutions in quadratures; existence, uniqueness and dependence on parameters, systems of first order equations, analysis of equilibria. Second order equations: series solutions and special functions, initial- and boundary-value problems for second-order equations. Elements of integral equations. First-order partial differential equations. Basic second-order partial differential equations: wave equations, heat equations, Poisson equation, Schrodinger equation. Pr.: MATH 634 or MATH 745 or consent of instructor.

MATH 841. Differential Equations II. (3) II. Where PDEs come from. Initial and boundary-value problems. A crash course in distribution theory: different spaces of distributions, Fourier and Laplace transformations of distributions, Sobolev spaces. The Poisson equation in bounded and in exterior domains; properties of solutions of elliptic equations. The classical evolution equations revisited. Energy estimates, existence and uniqueness theorems, regularity and other properties of solutions. Simple examples of nonlinear PDEs. Pr.: MATH 840.

MATH 852. Functional Analysis I. (3) I, in alternate years. Topics to be selected from linear topological spaces, seminormed linear spaces, Banach spaces, Hilbert spaces, Banach algebras, spectral theory, harmonic analysis, and others. May be taken four times for a total of 12 credit hours. Pr.: MATH 822.

MATH 853. Functional Analysis II. (3) II, in alternate years. Continuation of Functional Analysis I. May be repeated for credit. Pr.: MATH 852.

MATH 855. Methods of Applied Mathematics I. (3) An introduction to the mathematical techniques of problem solving in the sciences and engineering. Construction of mathematical models; problem formulation, dimensional analysis and scaling; solution methods for differential equations and difference equations; methods for obtaining approximate solutions; regular and singular perturbations methods, asymptotic series, applications to specific equations and scientific problems. Pr.: MATH 630, 633 and 551.

MATH 856. Methods of Applied Mathematics II. (3) A continuation of MATH 855. Asymptotic expansion of integrals; the methods of stationary phase and steepest descent;

summations of series, the Shanks transformation and the Pade fractions; boundary layer theory; the WKB and Langer approximations; the method of averaging and the method of multiple scales. Pr.: MATH 855.

MATH 861. Numerical Analysis I. (3) I. Topics covered may include elcmentary functional analysis relevant to numerical analysis; numerical solution of differential or integral equations; analysis of stability and convergence; numerical linear algebra including large-scalc systems; approximation theory. Pr.: MATH 634 and 655.

MATH 862. Numerical Analysis II. (3) II. Continuation of MATH 861. Pr.: MATH 861.

MATH 864. Theory of Ordinary Differential Equations I. (3) I. The modern theory of ordinary differential equations including general theory and the theory of linear differential equations. Pr.: MATH 641, 722 and 731.

MATH 865. Theory of Ordinary Differential Equations II. (3) II. Continuations of MATH 864 to include nonlinear equations and differential equations in Banach spaces. Pr.: MATH 864.

MATH 866. Partial Differential Equations I. (3) I. Elliptic, parabolic, and hyperbolic partial differential equations of the second order. First order partial differential equations, characteristics. Linear and nonlinear hyperbolic systems, nonlinear elliptic equations. Pr.: MATH 634, 641.

MATH 867. Partial Differential Equations II. (3) II. Continuation of MATH 866. Pr.: MATH 866.

MATH 871. General Topology I. (3) I. Topological spaces and topological invariants; continuous mappings and their invariants; perfect mappings; topological constructions (product, quotient, direct and inverse limit spaces). Pr.: MATH 700 and 701.

MATH 872. General Topology II. (3) II. Compact spaces and compactification, uniform and proximity spaces, metric spaces and metrization, topology of Rn, function spaces, complete spaces, introduction to homotopy theory. Pr.: MATH 871.

MATH 881. Differentiable Manifolds I. (3) I. Differentiable structures, tangent bundles, tensor bundles, vector fields and differential equations, integral manifolds, differential forms, Stokes' Theorem, DeRham cohomology, Riemannian metrics, introduction to Lie groups, topics in algebraic topology from a differentiable viewpoint. Pr.: MATH 702.

MATH 882. Differentiable Manifolds II. (3) Continuation of MATH 881. Pr.: MATH 881.

MATH 896. Topics in Mathematics. (Var.) I, II, S. Pr.: Background of courses needed for topic undertaken and consent of instructor.

MATH 897. Seminar in Mathematics Education. (1–3) II, S.

MATH 898. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor.

MATH 899. Thesis Topics. (Var.) I, II, S.

MATH 910. Universal Algebra I. (3) I. Topics include congruences, homomorphisms and isomorphisms, direct and subdirect products, varieties, Birkhoff's theorem, and the Mal'cev conditions. In addition, special topics will be selected from Stone duality, ultra products, Boolean products, and connections with model theory. Pr.: MATH 811.

MATH 911. Universal Algebra II. (3) II. Continuation of MATH 910. Pr.: MATH 910.

MATH 914. Lattice Theory I. (3) I, in alternate years. Posets, quantum logics, orthocomplemented, orthomodular, and Boolean lattices; the concepts of atomicity, completeness, reducibility, modularity, M-symmetry, O-symmetry, distributivity, algebraic coordinatization, and specific realization. Pr.: Consent of instructor.

MATH 915. Lattice Theory II. (3) II, in alternate years. Continuation of MATH 914.

MATH 920. Theory of Groups. (3) I. Group representations and group characters, transfer, signalizer functors, theory of pushing-up, groups of Lie type, (B, N)-pairs, chamber systems and buildings, sporadic simple groups, amalgam methods, Bass-Serre theory. Pr.: MATH 811.

MATH 924. Several Complex Variables. (3) An introduction to the theory and analytic functions of several variables, domains of homomorphy and pseudoconvexity, the Levi problem, delta bar equations, Cousin problems, zeros of analytic functions, integral formulas, holomorphic mappings. Pr.: MATH 826.

MATH 925. Group Representations and Character Theory I. (3) I. The basic topics in representation theory are covered: Schur's Lemma, irreducibility, class functions, characters, orthogonality relations, Frobenius-Schur theorem, induced characters and Frobenius reciprocity, Mackey's theorem, Clifford's theorem, exceptional characters and applications to group orders, generalized characters and Brauer's characterizations of characters. Pr.: MATH 811.

MATH 926. Group Representations and Character Theory II. Depending on the interests of the students, topics may be chosen from the following: modular representations, Brauer's theory of blocks, characters of the linear groups, homologically induced representations, representations of complex Lie algebras. Pr.: MATH 925.

MATH 971. Algebraic Topology I. (3) I. Homotopy groups, covering spaces, fibrations, homology, general cohomology theory and duality, homotopy theory. Pr.: MATH 702 and 811.

MATH 972. Algebraic Topology II. (3) II. Continuation of MATH 971. Pr.: MATH 971.

MATH 973. Low-Dimensional Topology I-Geometric Topology. (3) I. Manifolds, triangulations, differentiable structures, wild vs. tame embeddings, the Jordan Curve theorem, Schonflies Theorems, the classification of compact surfaces, Dehn's Lemma, the Triangulation Theorem and Huaptvermutung in dimensions 2 and 3, introduction to knot theory: knot groups, the Alexander polynomial, and related topics. Pr.: MATH 872 or 881.

MATH 974. Low-Dimensional Topology II-Quantum Topology. (3) II. Artin's braid groups, Markov's Theorem, the Jones Polynomial and its generalizations, state-sum invariants of knots and manifolds, skein-relations, quantum groups and categories of tangles, topological quantum field theories. Pr.: MATH 973 or consent of instructor.

MATH 991. Topics in Algebra. (3) On sufficient demand. Selected topics in modern algebra. May be repeated for credit. Pr.: Consent of instructor.

MATH 992. Topics in Analysis. (3) On sufficient demand. Selected topics in modern analysis. May be repeated for credit. Pr.: Consent of instructor.

MATH 993. Topics in Harmonic Analysis. (3) On sufficient demand. Selected topics in harmonic analysis. May be repeated for credit. Pr.: Consent of instructor.

MATH 994. Topics in Applied Mathematics. (3) On sufficient demand. Selected topics in applied mathematics. May be repeated for credit. Pr.: Consent of instructor.

MATH 995. Topics in Geometry. (3) On sufficient demand. Selected topics in geometry. May be repeated for credit. Pr.: Consent of instructor.

MATH 996. Topics in Topology. (3) On sufficient demand. Selected topics in topology. May be repeated for credit. Pr.: Consent of instructor.

MATH 997. Topics in Number Theory. (3) On sufficient demand. Selected topics in number theory. May be repeated for credit. Pr.: Consent of instructor.

MATH 999. Research in Mathematics. (Var.) I, II, S. Pr.: Sufficient training to carry on the line or research undertaken and consent of instructor.

For more information

For additional information and application materials please contact:
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Mechanical and Nuclear Engineering

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Donald L. Fenton, Ph.D., University of Illinois.
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Mohammad Hosni, Ph.D., Mississippi State University.
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Atul Kelkar, Ph.D.,Old Dominion University.
Prakash Krishnaswami, Ph.D., University of Iowa.
Kevin B. Lease, Ph.D., University of Iowa.
Sameer I. Madanshetty, Ph.D., Yale University.
Hui Meng, Ph.D., University of Houston.
David A. Pacey, Ph.D., Kansas State University.
J. Kenneth Shultis, Ph.D., University of Michigan.
Daniel V. Swenson, Ph.D., Cornell University.
Gale G. Simons, Ph.D., Kansas State University.
J. Garth Thompson, Ph.D., Purdue University.
Hugh S. Walker, Ph.D., P.E., Kansas State University.
Youqi Wang, Ph.D., Shanghai Jiao Tong University.
Warren N. White, Jr., Ph.D., Tulane University.
Xiao Jiang Xin, Ph.D., University of Sheffield, United Kingdom.

The department

The department consists of 24 graduate faculty members and over 70 graduate students. The department has aggressively expanded its research program into new and unique areas, and is quickly becoming one of the top research mechanical engineering programs in the nation. Research funding levels increased 313% between 1993 and 1997, or 62.8% per year. A significant fraction of the department faculty has exceeded research funding levels of greater than $100,000 per faculty member per year. When the program's $2.5 million per year research funding level is compared to those at other universities, the data shows that the program's funding level exceeds those at University of Kansas and Wichita State University. With the current growth rate, the department's funding level will approach those at Purdue University, Iowa State University, and other well-recognized mechanical engineering research programs.

The program facilities have grown significantly during the last six years. These facilities are mostly contained with the Durland Hall/Rathbone Hall/Ward Hall complexes with the Institute of Environmental Research

located in Seaton Hall and the National Gas Machinery Laboratory's Turbocharger Test and Research Facility located on K-State's Salina campus. These facilities support strong research programs that are striving for international prominence. Fort he most part, the departmental facilities are supported through extramural funds from the federal and state governments, research organizations, and private industry. The MNE faculty collaborates with the National Institute for Aviation Research to develop advanced general aviation aircraft. Faculty and students working in this collaborative effort work directly with engineers at Boeing, Cessna, Beechcraft, and supporting companies. Other research facilities include the engines laboratory, Mechanical Testing and Evaluations Laboratory, the Complex Fluid Flow Laboratory, and the the Two-Phase Flow Laboratory. The department is also the home of a TRIGA Mark-III nuclear reactor. A comprehensive listing of all the department's research facilities are contained within the department's graduate program web site.

Graduate students are recruited from all geographic regions. The department specifically caters to students graduating with a baccalaureate degree in physics, mathematics, or chemistry from four-year schools. These students find a rich and rewarding environment within the K-State MNE graduate program where they can strengthen their skills with mechanical engineering foundations. Applications are reviewed in the spring for entry during the fall semester and in the fall for entry during the spring semester. The department boasts a broad diversity of research topics. Graduate students have the opportunity to work in advanced research areas that include:

- Fatigue analysis
- Laser velocimetry
- Energy conversion
- Two-phase flow and alternative refrigerants
- Pollutant emission and reduction strategies
- Thermal comfort and indoor air quality
- Radiation measurement and dosimetry
- Acoustics and vibrations
- Finite-element analysis and crack propagation
- Reciprocating and gas turbine engines

The Department of Mechanical and Nuclear Engineering offers graduate study and research opportunities leading to the master of science and doctor of philosophy degrees. At the master's level, additional options exist for design-oriented thesis work and course-work-only programs. In keeping with the university tradition of providing a relevant engineering education, present course work and research (and design topics) are closely aligned with the technical problems of modern society. The development of a close student-faculty relationship is fostered by maintaining small class sizes and a low student-faculty ratio. Each program of study is tailored by the student and the faculty advisor to meet the student's needs and interests, while conforming to the academic requirements and standards of the department and the university. At the doctorate level, the student is expected to develop strength in the physical sciences and mathematics by taking course work in those fields deemed appropriate by his or her supervisory committee. The master's and Ph.D. degrees granted by the department are highly respected throughout the world.

The department offers competitive stipends, and almost all graduate students within the MNE department are funded with research project funds or as graduate teaching assistants. Typical stipends start at about $1,000 per month and can be $1,500 per month or higher. Students funded from research grants usually receive funding through the summer months as well as during the academic year. Research grants may also include funds for tuition reimbursement and other fees. Master's degrees typically require 18 to 24 months, and Ph.D. degrees require a commitment of about three years beyond the master's.

Foreign applicants are required to demonstrate their facility in the English language by making a satisfactory score of at least 600 on the Test of English as a Foreign Language (TOEFL) (GC9-24-65). All prospective graduate teaching assistants who are non-native speakers of English are required to achieve a minimum score of 240 on the TSE (Test of Spoken English) to be eligible for employment. International students appointed as graduate teaching assistants must arrive on campus by July 1 to participate in English instruction and pass the TSE with a minimum score of 240. All prospective graduate teaching assistants shall have their spoken English competency assessed prior to any teaching assignment through an interview with not less than three institutional personnel. Any graduate teaching assistant having classroom or laboratory instructional responsibility and/or direct tutorial responsibilities, other than for courses or sessions conducted primarily in a foreign language, found to be potentially deficient, shall be required to achieve a minimum score of 240 on the TSE even if such student has previously achieved such score prior to employment.

In addition to the TOEFL, GRE scores are required. The quantitative and analytical added together must equal at least 1,350.

Be sure to address all questions and/or inquiries about graduate studies in the department to the director of graduate studies in mechanical and nuclear engineering.

Master of science degree

A minimum of 30 credits (containing a 12 credit core) must include one 800–900 level mechanical and nuclear engineering course, and no more than two 600-level mechanical and nuclear engineering courses. Candidates for the master's degree are required to spend one academic year in residence, except under special conditions, when the residence may be reduced to one and one-half semesters, or three summer sessions of full time graduate study. Offerings numbered at the 700- and 800-level are particularly designated as master's-level work, and they should comprise a major portion of the program of study for the master's degree. Courses at the 600-level may be included, but the use of 500-level courses is restricted, as these are expected to have been completed as undergraduate prerequisites to graduate study or as undergraduate deficiency courses assigned upon admission. Accordingly, the use of 500-level supporting courses in master's programs of study is limited as follows:

1. No course in the student's major area may be included.

2. Within the 30 to 32 credits normally required for the MA or MS no more than two courses nor more than 20 percent of the program of study may be at the 500-level. In other master's programs no more than 20 percent of the credit for the degree may be at the 500-level. (GC2-7-84)

Doctor of philosophy degree

A minimum of 90 semester hours beyond the B.S. degree is required, or 60 semester hours beyond a master's degree. While the department encourages a master's degree for entrance into the Ph.D. program, students may work directly towards a Ph.D. without first earning a master's degree. A comprehensive examination and the writing and defense of a doctoral thesis are also required. Expectations are that most of the credit hours required for a Ph.D. are satisfied by enrolling in "dissertation" credit hours rather than formal classroom courses. The K-State MNE Ph.D. candidate can then focus on his or her research goals. See the Engineering section of this catalog for information on Ph.D. programs.

Mechanical and nuclear engineering courses

Undergraduate and graduate credit in minor field

ME 512. Dynamics. (3) I, II, S. Vector treatment of kinematics, Newton's Laws, work and energy, impulse and momentum, with applications to problems of particle and rigid body motion. Three hours rec. a week. Pr.: CE 333 and MATH 222.

ME 513. Thermodynamics I. (3) I, II, S. Properties of the pure substance. The first and second laws of thermodynamics. Three hours rec. a week. Pr.: PHYS 213; MATH 222.

ME 523. Thermodynamics II. (3) I, II. Continuation of Thermodynamics I. Gas mixtures, psychrometry, generalized thermodynamic relations and reactive systems. Three hours rec. a week. Pr.: ME 513.

ME 533. Machine Design I. (3) I, II. Displacement, velocity, and acceleration analysis of machine elements-cams, gears, and other mechanisms. A brief introduction to dynamics of machines. Three hours rec. a week. Pr.: ME 512.

ME 535. Mechanical Engineering Laboratory I. (3) I, II. Theory and application of mechanical engineering measurements, instrumentation, and computer-based data acquisition. One hour rec. and six hours lab a week. Pr.: ME 400, 513, and EECE 519.

ME 560. Engineering Economics. (3) I, II. Economic analysis of problems as applied in engineering. Three hours rec. a week. Pr.: ECON 110, junior standing in engineering.

ME 563. Machine Design II. (3) I, II. Design and analysis of machine elements, such as shafting, springs, screws, belts, brakes, clutches, gears, and bearings, with emphasis on strength, rigidity, and wear qualities. Three hours rec. a week. Pr.: CE 533 and ME 533.

ME 570. Mechanical System Dynamics. (4) I, II. Basic linear systems modeling and equation formulation techniques. Time response of low-order linear systems. Modeling of engineering systems including hydraulic, mechanical, electronic, and thermal systems. State equations and system response analysis. 3 hours lec. and 3 hours lab a week. Pr.: MATH 240. Pr. or conc.: ME 535 and 571.

ME 571. Fluid Mechanics. (3) I, II, S. Physical properties; fluid statics; dynamics of ideal and real fluids (for incompressible and compressible flow); impulse and momentum; laws of similitude; dimensional analysis; flow in pipes; flow in open channels; flow about immersed objects. Three hours rec. a week. Pr.: ME 512. Pr. or conc.: ME 513.

ME 573. Heat Transfer. (3) I, II. Fundamentals of conduction, convection, and radiation; principles of heat exchanger design and dimensional analysis. Three hours rec. a week. Pr.: ME 571, MATH 240.

ME 575. Mechanical Engineering Design Laboratory. (3) I, II. Application of the principles of the design process in the solution of engineering industrial-type problems with direct involvement of industry. Six hours lab a week. Pr. or conc.: ME 573 and 563.

ME 583. Mechanical Engineering Laboratory II. (2) I, II. Planning and executing experimental studies on mechanical and thermal systems; analysis of experimental results; oral and written reports. Six hours lab a week. Pr.: ME 535 and 571. Pr. or conc.: ME 573.

NE 500. Applied Engineering Analysis. (3) II. Methods and applications of analytical, statistical, and numerical analysis in engineering, including computer programming. Three hours rec. a week. Pr.: NE 415.

NE 501. Introduction to Nuclear Engineering. (3) I, II. An overview course to acquaint non-nuclear engineers with introductory aspects of nuclear engineering. Three hours rec. a week. Pr.: Junior standing in engineering or physical sciences.

NE 505. Elements of Nuclear Engineering. (3) I. Introduction to radioactive decay, neutron reactions and interactions, radiation interaction with matter, and reactor physics. Three hours lec. a week. Pr.: MATH 221, PHYS 213.

NE 512. Principles of Radiation Detection. (3) II. Operating principles and general properties of devices used in the detection and characterization of ionizing radiation. Two hours rec. and three hours lab. a week. Pr.: NE 505.

NE 515. Nuclear Engineering Materials. (3) I. An investigation of the nuclear properties, metallurgy, the processing of nuclear materials, and the behavior of fuels and components in a radiation environment. Three hours lec. a week. Pr.: NE 505, CHE 350.

NE 520. Neutron and Particle Interactions I. (2) II. Neutron interactions and associated cross sections of importance to nuclear reactor theory; fission and its application to reactor design; energetics of multiple neutron scattering and neutron thermalization. Two hours rec. a week. Pr.: NE 505.

NE 550. Radiation Protection Engineering. (2) II. Basic principles and concepts of radiation protection. Analysis of radioactive decay systematics, dose and risk concepts, description of natural and other sources of ionizing radiation, basic procedures of external and internal dose evaluation, waste storage and disposal. Two hours rec. a week. Pr.: MATH 240, ME 400, NE 505. Pr. or conc.: NE 512.

Undergraduate and graduate credit

ME 610. Finite Element and Finite Difference Applications in Mechanical Engineering. (3) I. The application of finite element and finite difference methods to the solution of engineering problems. Topics include introductions to the methods, linear elastic stress analysis, thermal analysis, flow analysis, and modeling limitations and errors. Commercial computer codes are used in the applications. Pr.: CE 533, ME 571, ME 523, ME 400. Co-Pr.: ME 573.

ME 620. Internal Combustion Engines. (3) I. Analysis of cycles, design and performance characteristics. Three hours rec. a week. Pr.: ME 523.

ME 622. Environmental Engineering I. (3) II. Psychrometry; heating-cooling system design; refrigeration basics. Three hours rec. a week. Pr. or conc.: ME 573.

ME 628. Aerodynamics. (3) I. A general introduction to aerodynamics including the analysis of lift, drag, thrust, and aircraft performance for subsonic aircraft. Three hours rec. a week. Pr.: ME 571, MATH 240.

ME 631. Aircraft and Missile Propulsion. (3) II. Mechanics and thermodynamics of aircraft and missile propulsion systems; combustion; air breathing jet engines; rockets; applied compressible flow; propellants; performance and design of propulsion systems. Three hours rec. a week. Pr.: ME 523, 571, MATH 240.

ME 633. Thermodynamics of Modern Power Cycles. (3) I. The first and second law analysis of modern steam cycles for both fossil-fuel and nuclear-fuel installations, Cycle efficiency and factors affecting performance, such as cycle design, load factor, and auxiliaries. Thermal pollution resulting from steam cycles. Three hours rec. a week. Pr.: ME 513.

ME 635. Dynamics of Flight-Stability and Control. (3) II. Development of the general dynamic equations of motion for six-degree-of-freedom aircraft. Aerodynamic and propulsion force and moment models, linear and flat earth approximations, static and dynamic stability and control analysis. Longitudinal and lateral normal modes, stability augmentation and automatic control design and simulation. Pr. or conc.: ME 640.

ME 640. Automatic Controls. (3) I, II. Functional description of dynamic systems, analysis and design of feedback systems. Basic controllers, sensitivity, stability, and error analysis. Transient and steady-state response, compensation techniques. Design of controllers using root locus and frequency response methods. Introduction to discrete-time systems. Two hours lec. and three hours lab per week. Pr.: ME 570.

ME 650. Introduction to Computer-Aided Design. (3) I. Scope of computer-aided design, computer-aided design workstations, interactive programming, numerical methods and computer graphics in computer-aided design, applications to design problems, introduction to finite elements, and optimal design. Pr.: ME 400, senior standing in engineering.

ME 651. Introduction to Composites. (3) II. The analysis and behavior of a laminate. Design, fabrication and testing of elements made of various composite materials. Two hours rec. and 3 hours lab a week. Pr.: CE 533, Senior standing in engineering.

ME 656. Machine Vibrations I. (3) I, II. A general consideration of free and forced vibration in machines for various degrees of freedom; critical speed; vibration isolation. Three hours rec. a week. Pr.: ME 512, MATH 240.

ME 670. Computer Control of Mechanical Systems. (3) II. Computer Control of Mechanical Systems, including thermal and fluid as well as electro-mechanical, discrete modeling and analysis of dynamic physical systems. Sampling and data conversion and reconstruction. Stability and performance specifications. Real time implementation. Digital controller design and implementation. Laboratory exercises in control applications and design. Two hours of recitation and three hours of laboratory per week. Pr.: ME 640.

ME 699. Problems in Mechanical Engineering. (Var.) I, II, S. Pr.: Approval of department head.

ME 716. Intermediate Dynamics. (3) II. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyrodynamics, and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: ME 512, MATH 240.

ME 720. Intermediate Fluid Mechanics. (3) I. A continuation of ME 571 in the study of general topics in fluid mechanics including viscous flow, turbulence and boundary layer theory. Numerous applications utilizing computational fluid dynamics. Pr.: ME 571, MATH 240.

ME 721. Thermal Systems Design. (3) I. Thermal systems design including economics, simulation, and optimization. Includes heating, ventilating and air conditioning design and control. Pr.: ME 573.

ME 722. Environmental Engineering II. (3) I, even years. Characteristics of air conditioning compressors, condensers, evaporators; system characteristics; air conditioning system controls; refrigeration systems; acoustics. Three hours rec. a week. Pr.: ME 622.

ME 730. Control Systems Analysis and Design. (3) II. Use of classical analysis techniques for control system compensation. State space-control theory fundamentals are presented in addition to an introductory treatment of several major systems areas. Pr.: EECE 530 or ME 640. Cross-listed with EECE 730.

ME 732. Robotic System Analysis. (3) I, even years. Modeling the static position and dynamic motion of a serial link manipulator. Forward and inverse kinematics, differential motion, path description and generation, dynamic and static forces, dynamic formulations, and feedback control of joint actuators. Project work includes robot computer software development and laboratory exercises. Pr.: ME 512, Pr. or conc.: ME 640.

ME 735. Geometric Modeling. (3) II, even years. Geometric aspects of computer graphics. Two- and three-dimensional homogeneous transformations; hidden line and surface removal; space curves and surfaces, including Bezier and B-spline methods; solid modeling; applications and current topics. Cross listed with CMPSC 735. Pr.: ME 650 or CMPSC 636 or EECE 636.

ME 736. Applied Elasticity. (3) I. Analysis of stress and strain at a point in an elastic medium; two-dimensional problems in rectangular and polar coordinates; torsion of bars; energy principles; numerical methods. Three hours rec. a week. Pr.: CE 533.

ME 738. Experimental Stress Analysis. (3) II, odd years. Experimental methods of investigating stress distributions. Photoelastic models, photoelastic coatings, brittle coatings, and resistance strain gauges applied to static and dynamic problems. Two hours rec. and three hours lab a week. Pr. or conc.: CE 533.

ME 756. Machine Vibrations II. (3) I, even years. Advanced consideration of systems having free and forced vibrations, with particular reference to several degrees of freedom, distributed mass, generalized coordinates, and non-linear forms. Three hours rec. a week. Pr.: ME 656.

ME 757. Kinematics. (3) I, odd years. Geometry of constrained motion applied to point paths, specific input-output relations, function generators, kinematic synthesis. Three hours rec. a week. Pr.: ME 533.

ME 760. Engineering Analysis I. (3) I. Methods of analysis employed in the solution of problems selected from various branches of engineering. Emphasis is on discrete systems. Three hours rec. a week. Pr.: MATH 240 or senior standing.

ME 762. Finite Elements. (3) I. The modeling of lumped parameter systems. Element formulation, assembly and solution are covered in detail. Standard element families, solution methods, energy techniques, display of results using computer graphics, and applications in heat transfer, fluid and structural mechanics. The student will develop a complete finite element program. Pr.: ME 400. Pr. or conc.: ME 573 or graduate standing.

ME 773. Intermediate Heat Transfer. (3) II. Conduction, convection and radiation, mass transfer, phase change, heat exchangers, introductory numerical methods. Three hours rec. a week. Pr.: NE 573.

ME 775. Optimal Mechanical Design. (3) II, odd years. The philosophy of optimal design; unconstrained minimization for single variable and multivariable cases; linear and quadratic programming; constrained nonlinear optimization; applications to design of structures, mechanisms, dynamic systems, components, control systems, etc. Pr.: ME 400, MATH 240, senior standing in engineering.

NE 602. Radiation Protection Engineering I. (3) II. Basic principles and concepts of radiation protection. Analysis of radioactive-decay systematics, dose and risk concepts description of natural and other sources of ionizing radiation, basic procedures of external and internal dose evaluation, waste storage and disposal. Three hours rec. a week. Pr.: NE 505. Pr. or conc.: NE 512.

NE 620. Problems in Nuclear Engineering. (Var.) I, II, S. Specific studies in current and advanced problems in various phases of nuclear engineering. Pr.: Consult program director.

NE 630. Nuclear Reactor Theory. (3) I. Theory of neutron diffusion and thermalization with application to steady-state nuclear reactors. Three hours rec. a week. Pr.: MATH 240, NE 505.

NE 648. Nuclear Reactor Laboratory. (3) I, II. Licensing, nuclear safety, and reactor operations. Measurement of neutronic, thermal-hydraulic, and health physics parameters. Two hour lec. and three hours lab. a week. Pr.: NE 505, ME 513 Pr. or conc.: ME 573.

NE 693. Radiation Shielding Design. (2) I. Sources of radiation, kernel concepts, and application of diffusion and ray theory to shielding design and analysis, with applications, principally, in nuclear reactor shielding, health physics, and medical physics. Two hours rec. a week. Pr.: NE 550.

NE 694. Nuclear Reactor Thermal Design. (3) II. Application of thermal-hydraulic principles to the design and analysis of nuclear power plants, with special emphasis on safety systems. Three hours rec. a week. Pr.: NE 630 and ME 573.

NE 761. Radiation Measurement Systems. (3) I. Principles of systems used to measure radiation. Applications to radiation monitoring, dosimetry, and spectroscopy. Three hours rec.. Pr.: NE 512.

NE 799. Special Topics in Nuclear Engineering. (Var.) On sufficient demand. Topical material of importance in nuclear engineering, such as controlled thermonuclear reactions, numerical analysis, Monte Carlo methods in radiation transport, effects of nuclear explosions, etc. Pr.: Consent of program director.

Graduate credit

ME 811. Thermodynamic Analysis. (3) II. Basic considerations of the three laws of equilibrium thermodynamics. Availability analysis with applications including multicomponent systems. Three hours rec. a week. Pr.: ME 523, 571, MATH 240.

ME 815. Gas Dynamics. (3) II, in odd years. Properties of compressible fluids, subsonic and supersonic flow, steady and nonsteady motion, with emphasis on one-dimensional flow. Three hours rec. a week. Pr.: MATH 240, ME 523, 571.

ME 818. Introduction to the Theory of Continuous Media. (3) II, odd years. Analysis of strain, motion, and stress; fundamental laws; constitutive equations; applications to fluid, elastic, and plastic media. Three hours rec. a week. Pr.: ME 512, MATH 240.

ME 820. Intermediate Topics in Thermal and Fluid Mechanics. (Var.) On sufficient demand. Topics may include combustion, direct energy conversion, modeling and design of internal combustion engines, nonequilibrium multiphase and multicomponent systems, refrigeration, cryogenics, stability and turbulence. Pr.: ME 720 or ME 773.

ME 830. Intermediate Topics in Automatic Controls. (Var.) On sufficient demand. Topics may include analysis and design of nonlinear, adaptive, optimal, digitals or stochastic control systems and the applications of intermediate control and stability theory. Pr.: ME 730 or EECE 730 or consent of instructor.

ME 831. Boundary Layer Theory. (3) II, even years. The development and solution of various laminar boundary layer problems involving momentum, heat, and mass transfer for a compressible viscous fluid. Three hours rec. a week. Pr.: ME 573.

ME 836. Introduction to Fracture Mechanics. (3) II, even years. This course provides an introduction to fracture mechanics concepts and applications. Topics include the asymptotic solution for stress at a crack tip, energy balance and crack propagation, computing stress intensity factors, fatigue crack growth, fracture of concrete, applications and current topics. Pr.: ME 736 or CE 730.

ME 840. Intermediate Topics in Solid Mechanics and Machine Design. (Var.) On sufficient demand. Topics may include intermediate elasticity, plasticity, tribology, probabilistic machine design, robotics, computational dynamics and nonlinear mechanics. Pr.: ME 716 or ME 736.

ME 846. Random Vibration. (3) I, odd years. Theory of random processes and application to random vibration of mechanical systems. Three hours rec. a week. Pr.: ME 656.

ME 860. Engineering Analysis II. (3) II. Continuation of Engineering Analysis I. Emphasis placed on continuous systems. Three hours rec. a week. Pr.: ME 760 or consent of instructor.

ME 862. Finite Elements. (3) II. The foundations of the finite element method using weighted residuals and variational methods. Element formulation, assembly and solution are covered in detail. Formulation for dynamic and nonlinear problems. Discussion of advanced topics. The student will develop a complete finite element program. Pr.: ME 760. Pr. or conc.: ME 736.

ME 871. Mechanics of Composite Materials. (3) II. Topics include classification of composite materials, elasticity theory for anisotropic and in homogeneous materials, basic model for characterization of composite properties, laminated plate theory, textile composites, strength and criteria for composite failure, and fracture modes in composites. Pr.: ME 736.

ME 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head.

ME 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head.

ME 913. Thermodynamics and Transport Properties. (3) I, odd years. Comprehensive study of the laws of thermodynamics. Use of kinetic theory and statistical thermodynamics for prediction of thermodynamic properties, thermodynamic equilibrium, transport properties, irreversible processes and fluctuations. Three hours rec. a week. Pr.: ME 811.

ME 920. Advanced Topics in Thermal and Fluid Mechanics. (Var.) On sufficient demand. Topics may include combustion, direct energy conversion, modeling and design of internal combustion engines, non-equilibrium multiphase and multicomponent systems, refrigeration, cryogenics, stability and turbulence. Pr.: ME 720 or ME 773 or ME 913.

ME 921. Thermal System Analysis. (3) II, odd years. Advanced study of steady-state and dynamic simulation of thermal systems; thermal systems optimization. Thermodynamic availability and probabilistics in thermal system design. Three hours rec. a week. Pr.: ME 721.

ME 930. Advanced Topics in Automatic Controls. (Var.) I, II. On sufficient demand. Topics may include analysis and design of nonlinear, adaptive, optimal, digital, or stochastic control systems and the application of advanced control and stability theory. Pr.: ME 640.

ME 935. Heat Conduction in Solids. (3) I, in odd years. General differential equation of heat conduction and methods of solution for steady-state and transient heat conduction, periodic heat flow, and internal heat sources. Three hours rec. a week. Pr.: ME 573.

ME 940. Advanced Topics in Solid Mechanics and Machine Design. (Var.) On sufficient demand. Topics may include advanced elasticity, plasticity, tribology, probabilistic machine design, robotics, advanced and computational dynamics and nonlinear mechanics. Pr.: ME 736 or ME 716 or ME 846.

ME 942. Convection Heat Transfer. (3) II, odd years. Energy and momentum equations in convective heat transfer, laminar and turbulent thermal boundary layers, steady and nonsteady convection problems. Three hours rec. a week. Pr.: ME 573.

ME 943. Radiation Heat Transfer. (3) I, even years. Basic theories of thermal radiation, shape factors; exact and approximate solutions of integral equations of radiation heat transfer between solid surfaces with absorbing or nonabsorbing medium. Three hours rec. a week. Pr.: ME 573.

ME 947. Boiling Heat Transfer. (3) I, in alternate years. Principles of boiling heat transfer and thermal hydraulics of two-phase flow; computational methods; design and analysis applications. Three hours rec. a week. Pr.: NE 847 or ME 942. Cross listed with NE 947.

ME 999. Dissertation Research in Mechanical Engineering. Ph.D. level. (Var.) I, II, S. Pr.: Approval of department head and major professor.

NE 806. Neutronics. (3) I. Particle transport, theories of diffusion, numerical analysis of diffusion, transient core analysis. Three hours rec. a week. Pr.: NE 630.

NE 810. Graduate Problems in Nuclear Engineering. (Var.) I, II, S. Specific studies in advanced problems in various phases of nuclear engineering. Pr.: Graduate standing and consent of program director.

NE 847. Nuclear Power Engineering. (3) II. Advanced techniques in thermal-hydraulic analysis as applied to nuclear power reactors, including computational methods used for conduction and convection heat transfer. Three hours rec. a week. Pr.: ME 573 or equiv.

NE 851. Nuclear Engineering Laboratory. (2), I, S (on demand). Design of experiments for the TRIGA nuclear reactor. Six hours lab a week. Pr.: NE 630 and 648.

NE 860. Advanced Topics in Nuclear Engineering. (Var.) I, II, S. A presentation of various special topics covering advanced nuclear engineering specialties. Pr.: Graduate standing and consent of program director.

NE 890. Nuclear Engineering Colloquium. (1) I, II. Presentation and discussion of progress reports on research, special problems, and outstanding publications in nuclear engineering and related fields. Pr.: Graduate standing in nuclear engineering.

NE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and program director.

NE 947. Boiling Heat Transfer. (3) I, in alternate years. Principles of boiling heat transfer and thermal hydraulics of two-phase flow; computational methods; design and analysis applications. Three hours rec. a week. Pr.: NE 847 or ME 942 or equivalent (cross-listed with ME 947).

NE 998. Selected Advanced Topics in Nuclear Engineering. (Var.) II. On sufficient demand. Current topics of interest in nuclear engineering at an advanced level, such as controlled thermonuclear reactions, numerical analysis, Monte Carlo methods in radiation transport, etc. Pr.: Consent of program director.

NE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and program director.

For more information

For additional information and application materials please contact:
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Modern Languages

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Salvador A. Oropesa, Ph. D., Arizona State University.
Michael Ossar, Ph.D., University of Pennsylvania.
Silvia Sauter, Ph.D., University of Texas-Austin.
Bradley A. Shaw, Ph.D., University of New Mexico.
George C. Tunstall, Ph.D., Princeton University.

Program description
The graduate program in modern languages offers the M.A. degree in French, German, and Spanish, with two optional areas of emphasis: literature and language acquisition.

Literature
The program is designed to help the student attain a high level of skills proficiency in all aspects of the chosen language; how to read, analyze, interpret, and discuss in an intelligent manner a wide selection of works in the chosen language; and to synthesize the material read into an accurate and coherent picture of the literary and cultural developments of the chosen language-speaking area. Selected classes are available in the afternoon or evening and during the summer. This degree is recommended for those students who wish to continue graduate work elsewhere, with the intention of teaching at the secondary or university level, or for students who prefer to develop their skills in language and literature in preparation for other careers.

In the literature option students may choose to complete the degree with a minimum of 24 hours of graduate courses and a thesis (typically 60–80 pages in length), or they may complete 30 hours and produce a written report on a topic in the major field with evidence of other scholarly work such as term papers, or they may complete a minimum of 30 hours of graduate course work including such evidence of scholarly effort as term papers.

Language acquisition
The program is designed to meet the needs of practicing and potential secondary school teachers. It is intended to enhance language skills, cultural awareness, and general humanistic development; encourage new patterns and techniques of teacher preparation and teacher/student interaction in the classroom; narrow the traditional gap in graduate study between teaching methodology and the content areas of literature and culture; facilitate the professional certification of prospective teachers; and encourage professional development and communication in the field. Emphasis is given to the integration of linguistic, cultural, literary, and methodological concepts that may have direct application in the classroom. Selected courses are available in the late afternoon or evening via a telephone communications system, thus making it possible for a practicing teacher to participate in class discussions using special equipment at home. Summer credits are also offered through on-campus offerings.

In the language acquisition option, students complete the degree with a minimum of 24 hours of graduate course work (as outlined in the special list of classes for this degree) and a thesis that applies the integration of cultural, literary, and methodological components to the language classroom.

Final examinations
In both program options a final comprehensive written and oral examination is required at the completion of work. This exam is tailored to the particular M.A. option. It generally takes two years to complete the M.A. program in literature. Practicing teachers who typically take only one course per semester may need an additional year or two to complete the option in language acquisition.

Teaching support
The Department of Modern Languages prides itself on the excellence of its teaching staff, and it considers one of its most important goals that of training outstanding future teachers. The faculty works closely both with on-campus teaching assistants and practicing teachers to ensure the maximum benefit from the program.

Careers
Graduates in modern languages may also wish to pursue careers in textbook publishing, consultation in multimedia language programs, educational graphics, translation and editing, educational foundations, educational travel, and educational administration. Some of these career fields require additional specialized training. The knowledge of a language, culture, and literature at this level can also be combined with other fields: journalism, ecology, theology, music and art, film, library science, and trade organizations.

Special programs and activities
We offer summer programs in Cuernavaca, Mexico, and Granada, Spain, and participate in full-year exchange programs in Giessen, Munich, and Zurich. Graduate students in German may qualify for substantial scholarships in a recently expanded program for study in selected universities of Austria, Germany, or Switzerland. The university has an agreement with the University of Costa Rica and connections to a number of study abroad programs including International Students Exchange Program. The department co-sponsors the publication of *Studies in Twentieth Century Literature*, a scholarly journal devoted to the study of literature written in French, German, Russian, and Spanish.

In 1988 and 1991 the department received major grants from the National Endowment for the Humanities to conduct a year-long institute for secondary-school foreign-language teachers. Through these Institutes, our faculty developed considerable expertise in the integration of language, culture, and literature in secondary instruction. A substantial amount of the course work was carried out using a telecommunications system provided by the Regents TELEnet system located in the Educational Communications Center on campus. The department also cooperates with ECC staff in the development of Spanish courses which are transmitted by satellite to high schools all over the United States.

Financial support
A limited number of graduate teaching assistantships is available that offer the opportunity of teaching university-level courses under close pedagogical supervision. Appointments may be partial (teaching two courses per year) or full-time (three courses per year). All full-time GTAs receive a 100 percent tuition waiver. Those who have partial appointments will receive a tuition reduction. GTAs must be enrolled in a minimum of 6 hours of classwork per semester to qualify. Except in unusual circumstances, GTAs are expected to enroll in 9 hours. Assistantships are normally renewable for a period of two years, assuming satisfactory teaching performance and progress toward the degree.

Admission
Most incoming students have undergraduate degrees in the particular language or in teaching, although we also may accept on a provisional basis those students who have considerable expertise in the language and culture in other ways, e.g., native speakers or U.S. citizens with extensive travel, living, and educational experience abroad.

We do not require the GRE examination for admission. Graduate applications to begin study in the fall must be received in our office by March 1, and by October 1 for the spring. Depending on the language you wish to study, assistantships may or may not be available after this date.

All international students must provide evidence of financial support. International students who do not have a degree from a

university in the U.S. must submit a minimum TOEFL score of 560 before they will be admitted to any graduate program at K-State. International students who apply for a teaching assistantship must attain a minimum score of 240 on the Test of Spoken English as well. We do have courses in English as a second language on campus in July and August to help applicants reach this TSE speaking score should they require it. It is in the applicant's best interest to take both the TOEFL and the TSE early if possible.

Modern languages courses

Courses at the 500 level may not be included in the M. A. program of study unless they are in a language or discipline other than the candidate's major field.

Courses taught in English

Undergraduate and graduate credit in minor field

GRMN 503. German Literature in Translation. (3) Selected readings in English from such major German authors as Mann, Brecht, Hesse, Grass, and Kafka.

LATIN 501. Classical Literature in Translation. (3) Selected readings in English from the works of such major classical authors as Homer, Euripides, Vergil, Horace, and Terence.

MLANG 507. European Literature in Translation. (3) Selected readings in English from the major authors of Europe and the Spanish-speaking world.

RUSSN 504. Russian Literature in Translation: The Nineteenth Century. (3) Survey of the principal writers of tsarist Russia with emphasis upon Turgenev, Dostoevsky, Tolstoy, and Chekhov.

RUSSN 508. Russian Literature in Translation: The Soviet Period. (3) The development of Russian literature since the Revolution, with emphasis upon Mayakovsky, Sholokov, Pasternak, and Solzhenitsyn.

Graduate credit

MLANG 710. Introduction to Foreign Language Pedagogy. (3) I. The fundamentals of language learning as described by current research, and teaching strategies that facilitate the acquisition of foreign language skills. Taught in English. Pr.: Acceptance as GTA or instructor in ML.

MLANG 800. Colloquium in Modern Languages. (2) A graduate colloquium for M. A. candidates in French, German, and Spanish. Variable topics in literary and cultural fields appropriate to study in common by students in these languages.

French

Undergraduate and graduate credit in minor field

FREN 511. Masterpieces of French Literature I. (3) The reading and discussion of major works of French literature from the Middle Ages to the end of the eighteenth century. Pr.: At least one course taught in French at the 500 level or equiv.

FREN 512. Masterpieces of French Literature I. (3) The reading and discussion of major works of French literature from the early nineteenth century to the present. Pr.: At least one course taught in French at the 500 level or equiv.

FREN 513. French Composition and Grammar. (3) Review in depth of the structure of the language. Intensive practice in written and conversational French. Pr.: FREN 213 or equiv.

FREN 514. French Civilization. (3) Introduction to French culture with special emphasis on social and historical developments since World War II. Pr.: FREN 213 or equiv.

FREN 516. Readings in French. (3) Practice in reading a variety of literary, journalistic, and specialized texts. Pr.: FREN 213 or equiv.

FREN 517. Commercial French. (3) Advanced grammar necessary for adequate oral and written expression in international business and diplomatic situations, including specialized terminology, conversation and discussion, and translation. Pr.: FREN 213 or equiv.

FREN 518. Advanced French Conversation. (3) Practice in spoken French, with emphasis on idiomatic expression. Course not open to students whose primary language is French and whose competence has been demonstrated in the language at this level. May be repeated once for credit. Pr.: FREN 213 or equiv.

Undergraduate and graduate credit

FREN 709. Medieval French Literature. (3) An introduction to literary forms, style, and thought from the eleventh century to the fifteenth century in France. Readings in modern French include Chanson De Roland, Chrétien de Troyes, Roman de la Rose, etc. Pr.: FREN 511 and 512.

FREN 710. Sixteenth-Century French Literature. (3) Reading and discussion of selected prose and poetry of the French Renaissance. Pr.: FREN 511 and 512.

FREN 711. Seventeenth-Century French Literature I. (3) I. Various literary forms of the French baroque period. Reading of representative texts by Corneille, Pascal, Descartes, and others. Pr.: FREN 511 and 512.

FREN 712. Seventeenth-Century French Literature II. (3) II. Various literary forms of the French classical period. Reading of representative texts by Molière, Racine, Lafayette, La Fontaine, and others. Pr.: FREN 511 and 512.

FREN 713. Eighteenth-Century French Literature. (3) Critical study of the literature of the Enlightenment. Pr.: FREN 511 and 512.

FREN 714. Nineteenth-Century French Literature I. (3) A study of preromanticism and romanticism. Pr.: FREN 511 and 512.

FREN 715. Nineteenth-Century French Literature II. (3) A study of realism, naturalism, and symbolism. Pr.: FREN 511 and 512.

FREN 716. Twentieth-Century French Literature I. (3) The study of major themes and trends in the novel, drama, and poetry as reflected in representative works of such authors as Proust, Mauriac, Cocteau, Claudel, Valéry, and others. Pr.: FREN 511 and 512.

FREN 717. Twentieth-Century French Literature II. (3) Reading and analysis of recent innovations in literary theory and practice as found in the works of such authors as Sartre, Camus, Beckett, Ionesco, Robbe-Grillet, Sarraute, and others. Pr.: FREN 511 and 512.

FREN 718. The French Novel. (3) The development of the novel from the seventeenth century to the present, seen through selected masterworks. Pr.: FREN 511 and 512.

FREN 719. Advanced Spoken and Written French. (3) II. An advanced, intensive study of French prose style. Introduction to the techniques of translation from English to French. Intensive practice in oral style and diction. Pr.: FREN 511 and 512.

FREN 720. Seminar in French. (3) A seminar with variable topics. Pr.: FREN 511 and 512.

FREN 742. French-Speaking Culture and Literature in Second-Language Learning. (3) Analysis and interpretation of cultural and literary texts from French-speaking countries, with emphasis on the development of interpretive skills and materials, and their application to the French curriculum at all levels. May be repeated once with a change in focus and texts. Pr.: FREN 511 and 512.

FREN 799. Problems in Modern Languages. (Var.) Pr.: FREN 511 and 512.

Graduate credit

FREN 899. Research in Modern Languages. (Var.)

German

Undergraduate and graduate credit in minor field

GRMN 503. German Literature in Translation. (3) Selected readings in English from such major German authors as Mann, Brecht, Hesse, Grass, and Kafka.

GRMN 521. Introduction to German Literature I. (3) Literary movements of the nineteenth century are introduced through the reading and discussion of texts in various forms and by representative authors.

GRMN 522. Introduction to German Literature II. (3) Discussion of significant works of twentieth-century prose, poetry, and drama. Special emphasis is placed on the literature of recent decades.

GRMN 523. German Composition. (3) A study of German syntax and exercises in composition.

GRMN 524. German for Reading Knowledge I. (3) The grammar and syntax of German and the reading of basic material selected from modern German texts. (This course is designed for students who need to be able to read German.)

GRMN 525. German for Reading Knowledge II. (3) Continued reading of material from modern German texts. (This course is designed for students who need to be able to read German.)

GRMN 526. Business German. (3) Advanced grammar necessary for adequate oral and written expression in international business and diplomatic situations, including specialized terminology, conversation and discussion, and translation.

GRMN 527. Advanced German Conversation. (3) Intensive practice in conversation.

GRMN 530. German Civilization. (3) The political and cultural development of the German-speaking people and their role and influence in the history of the Western world.

Undergraduate and graduate credit

GRMN 721. German Classicism. (3) Reading and discussion of late eighteenth-century texts, including works by Goethe, Schiller, Hoelderlin, etc.

GRMN 722. German Romanticism. (3) A study of representative works of German romantic literature by such authors as Schlegel, Tieck, Eichendorff, Novalis.

GRMN 723. Goethe and Faust. (3) The writings of Goethe and his masterpiece, Faust.

GRMN 724. German Prose and Drama of the Nineteenth Century. (3) A consideration of post-romantic German literature with special emphasis on the novella. Authors including Grillparzer, Keller, and Meyer are discussed.

GRMN 725. Early Twentieth-Century German Literature. (3) A study of the drama and lyric of naturalism, neoclassicism, neo-romanticism, and expressionism.

GRMN 726. German Literature since 1945. (3) A discussion of the postwar writings of the Gruppe 47, Swiss playwrights, and others.

GRMN 727. The Modern German Novel. (3) Theory of the German novel with examples from authors such as Mann, Hesse, Grass, and others.

GRMN 728. History of the German Language. (3) A study of the development of the sounds, forms and syntax of standard German.

GRMN 729. Seminar in German. (3) A seminar with variable topics, including literature of social and political protest, Austrian and Swiss literature, literature of the Middle Ages, emigre literature, etc.

GRMN 731. Advanced Spoken and Written German. (3) Intensive practice in conversation and diction, with considerable practice in the writing of essays in German.

GRMN 732. Methods in German Literary Criticism. (3) Introduction to the various theories of literary analysis. Interpretation of representative German texts.

GRMN 733. The Enlightenment and Storm and Stress. (3) A study of representative texts from various movements in German literature and culture of the eighteenth century,

including Empfindsamkeit and Rococo. Such authors as Gottsched, Klopstock, Lessing, Lichtenberg, Wieland, and the young Goethe and Schiller will be discussed.

GRMN 734. Literature of the German Democratic Republic. (3) A study of the literary developments within the German Democratic Republic. The course will consider the writers' role in a socialist society and their impact upon the cultural scene. Readings will include representative works from all genres.

GRMN 735. German Lyric Poetry. (3) A study of German lyric poetry from the Middle Ages to the present with special emphasis on the historical development of such genres as the lied, sonnet, and ballad. In addition to learning basic interpretive techniques intrinsic to poetry, the student will learn to identify the literary periods. Pr.: 21 hours of college German.

GRMN 740. German Culture and Literature in Second-Language Learning. (3) Analysis and interpretation of cultural and literary texts from German-speaking countries, with emphasis on the development of interpretive skills and materials, and their application to the German curriculum at all levels. May be repeated once with a change in focus and texts.

GRMN 799. Problems in Modern Languages. (Var.)

Graduate credit

GRMN 899. Research in Modern Languages. (Var.)

Latin

Undergraduate and graduate credit in minor field

Latin 501. Classical Literature in Translation. (3) Selected readings in English from the works of such major classical authors as Homer, Euripides, Vergil, Horace, and Terence.

Linguistics

Undergraduate and graduate credit in minor field

LG 730. Foundations of Semiotics. (3) The general theory of signs; detailed classification of signs and examination of several semiotic systems such as language, literature, culture, and society. The semiotics of communication and signification.

LG 600. Principles of Linguistics. (3) Same as LING 600 and ENGL 600.

LG 601. General Phonetics. (3) Same as LING 601 and ENGL 601.

LG 602. Historical Linguistics. (3) Same as LING 602 and ENGL 602.

LG 603. Topics in Linguistics. (3) Same as LING 603 and ENGL 603.

LG 783. Phonology I. (3) Same as LING 783 and ENGL 783.

LG 785. Syntax I. (3) Same as LING 785 and ENGL 785.

LG 792. Field Methods in Linguistics. (3) Same as LING 792.

Russian

Undergraduate and graduate credit in minor field

RUSSN 504. Russian Literature in Translation: The Nineteenth Century. (3) Survey of principal writers of Tsarist Russia with emphasis upon Turgenev, Dostoevsky, Tolstoy, and Chekhov.

RUSSN 508. Russian Literature in Translation: The Soviet Period. (3) The development of Russian literature since the Revolution, with emphasis upon Mayakovsky, Sholokhov, Pasternak, and Solzhenitsyn.

RUSSN 551. Russian V. (3) Reading of Russian short stories of the nineteenth and twentieth centuries, including works by Pushkin, Lermontov, Dostoevsky, and Chekhov.

RUSSN 552. Survey of Russian Literature. (3) A history of Russian literature from its beginnings until the present, with emphasis on the works of the nineteenth century, including those of Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, and Tolstoy.

RUSSN 553. Russian Conversation and Composition. (3) Discussion in Russian. Extensive practice in writing Russian compositions.

Spanish

Undergraduate and graduate credit in minor field

SPAN 505. Spanish Literature in Translation. (3) Selected readings in English from the works of such major Spanish and Latin American authors as García Lorca, Borges, Neruda, and García Márquez.

SPAN 550. Introduction to Literature in Spanish. (3) An introduction to literary terminology and its practical application for analyzing and interpreting texts from Spain and Spanish America. Strongly recommended for students planning to take SPAN 563 or SPAN 567. Pr.: SPAN 564 or equiv.

SPAN 563. Introduction to Literature of Spanish America. (3) Reading and analysis of representative works of Spanish-American literature from the colonial period to the present. Pr.: SPAN 263 or equiv.; SPAN 550 strongly recommended.

SPAN 564. Spanish Composition and Grammar. (3) The grammar and syntax of modern Spanish.

SPAN 565. Spanish Civilization. (3) Survey of Spanish culture and civilization from its beginnings to the present; emphasis on Spanish contributions over the centuries in the humanistic field.

SPAN 566. Hispanic-American Civilization. (3) Survey of Spanish-American culture and civilization from 1492 to the present.

SPAN 567. Introduction to the Literature of Spain. (3) Reading and analysis of representative works of Spanish literature from its beginnings to the present.

SPAN 570. Structure of the Spanish Language. (3) Introductory description of the grammatical structure of Spanish, with its main components: phonological, morphological, syntactic and semantic. Spanish pronunciation, dialectal variation and some other aspects are analyzed in contrast. Required of all Spanish majors. Pr.: SPAN 564 or equiv. facility as determined by Modern Language faculty.

SPAN 571. Advanced Spanish Conversation. (3) Intensive practice in conversation.

SPAN 573. Spanish for the Professions. (3) Advanced grammar necessary for adequate oral and written expression in selected professional disciplines (such as business, health professions, and human services), including specialized terminology, conversation and discussion, and translation.

SPAN 574. Hispanic Readings. (3) Practice in reading a variety of literary, journalistic, and specialized texts.

Undergraduate and graduate credit

SPAN 750. Spanish-American Literature from Its Origins to the Nineteenth Century. (3) Analysis and discussion of literary manifestations from pre-Columbian civilizations, the Spanish colonies, and independent nations. Literary movements include early forms of narrative, the Baroque, Neo-Classicism and Romanticism. Texts by writers such as Aztec poets, Spanish chroniclers, Sor Juana, Fernández de Lizardi, Hernández, Isaacs, Gómez de Avellaneda, Echeverría, and others. Pr.: SPAN 563 and 567.

SPAN 751. Spanish-American Literature: Late Nineteenth Century to Early Twentieth Century. (3) Analysis and discussion of significant literary trends and movements, including Realism, Naturalism, Modernism, and the Avant-Garde, including writers such as Blest Gana, Cambaceres, Martí, Darío, Güiraldes, Azuela, Gallegos, Rivera and Bombal. Pr.: SPAN 563 and 567.

SPAN 752. Contemporary Spanish-American Narrative. (3) Analysis and discussion of the narrative from the period of the Boom to the present. Includes writers such as Borges, Sábato, Cortázar, García Márquez, Vargas Llosa, Fuentes, Allende and Valenzuela. Pr.: SPAN 563 and 567.

SPAN 755. Spanish-American Drama. (3) Analysis and discussion of the drama of Spanish-speaking American nations, with emphasis on the Twentieth Century. Readings from such leading playwrights as Usigli, Márquez, Carballido, Triana, Gambaro, Leñero, and Castellanos. Pr.: SPAN 563 and 567.

SPAN 756. Nineteenth-Century Spanish Literature. (3) Study of nineteenth-century Spanish literature: drama, essay, novel, poetry, and short story. Such authors as Larra, Zorrilla, el Duque de Rivas, Espronceda, Tamayo y Baus, Echegaray, Bécquer, and Pérez Galdós will be discussed. Pr.: SPAN 563 and 567.

SPAN 761. Medieval and Renaissance Literature. (3) Reading and interpretation of the principal literary works of Medieval and Renaissance Spain, from the jarchas and the Poema de Mio Cid to the Cronicas and La Celestina, studied within the historical and cultural context of each. Pr.: SPAN 563 and 567.

SPAN 763. Twentieth-Century Spanish Literature. (3) The major writers and directions of twentieth-century literature in Spain. Analysis and discussion of the works of such representative authors as Unamuno, Jiménez, Guillén, Lorca, Cela, Buero Vallejo, and Delibes. Pr.: SPAN 563 and 567.

SPAN 764. Spanish Literature of the Golden Age. (3) Reading and analysis of the works of such major writers as Lope de Vega, Tirso de Molina, Calderón de la Barea, Garcilaso, Fray Luis de León, San Juan de la Cruz, Góngora, and Quevedo, as well as selected works from the picaresque tradition. Pr.: SPAN 563 and 567.

SPAN 766. Spanish Poetry. (3) The development of the poetry of Spain from the Middle Ages to the 20th Century. Includes poets such as Berceo, the romanceros, Manrique, Góngora, Quevedo, Espronceda, Bécquer, Machado, Lorca, Guillén, Otero, Fuertes, Rodríguez, and Rossetti. Taught as a seminar. Pr.: SPAN 563 and 567.

SPAN 767. Spanish-American Poetry. (3) The development of poetry from its early pre-Columbian manifestations to the present time, with emphasis on the Twentieth Century. Includes poets such as Sor Juana, Martí, Darío, Borges, Vallejo, Neruda, Paz, Storni, Agustini, and Castellanos. Taught as a seminar. Pr.: SPAN 563 and 567.

SPAN 770. Introduction to Hispanic Linguistics. (3) Linguistic theory as it is applied to the Spanish language. Linguistic topics include syntax, phonology, morphology, semantics, sociolinguistics, and psycholinguistics. Other topics include dialectology, bilingualism, and the creative use of language. Of interest to students to both language acquisition and literature. Taught in Spanish. Pr. SPAN 564 and 570.

SPAN 771. Introduction to Spanish Translation. (3) Translation theory and practice as applied to Spanish. Translations from Spanish to English and English to Spanish, involving unique problems related to science, business, reporting, and literature. Pr.: Minimum of 6 hours of college Spanish.

SPAN 772. The Hispanic World Today. (3) An investigation of selected social, political, and humanistic aspects of contemporary Hispanic culture. Pr.: Minimum of 6 hours of college Spanish.

SPAN 775. Cervantes. (3) Reading and discussion of the works of Cervantes and of his literary and cultural background. Pr.: SPAN 563 and 567.

SPAN 777. Spanish and Spanish-American Culture and Literature in Second-Language Learning. (3) Analysis and interpretation of cultural and literary texts from Spanish-speaking countries, with emphasis on the development of interpretive skills and materials, and their application to the Spanish curriculum at all levels. May be repeated once with a change in focus and texts. Pr.: Minimum of 6 hours of college Spanish.

SPAN 779. Seminar in Spanish. A seminar with variable topics.

SPAN 799. Problems in Modern Languages. (Var.)

Graduate credit
SPAN 899. Research in Modern Languages.

For more information

For additional information and application materials please contact:
Coordinator, Graduate Programs
Department of Modern Languages
Kansas State University
104 Eisenhower Hall
Manhattan, KS 66506–1003
Phone: 785-532-6760
Fax: 785-532-7004
Home page: http://www.ksu.edu/mlangs

Music

Head
Paul Hunt

Director of graduate studies
Craig B. Parker

Graduate faculty
Alfred W. Cochran, Ph.D., Catholic University of America.

Cora Cooper, D.M., Florida State University.

Jennifer R. Edwards, D.M.A., Conservatory of Music at the University of Missouri–Kansas City.

Robert L. Edwards, D.M.A., University of Oregon.

Jana Fallin, Ph.D., University of Texas–Austin.

Sara Funkhouser, D.M., University of Missouri–Kansas City.

Dale Ganz, M.M., Opera Diploma, University of Cincinnati.

Wayne Goins, Ph.D., The Florida State University.

Virginia Houser, D.M.A., University of Oklahoma.

Paul Hunt, D.M.A., University of Rochester.

T. Hanley Jackson, M.A., California State College at Long Beach.

Jerry R. Langenkamp, D.M.A., University of Michigan.

David Littrell, D.M.A., University of Texas–Austin.

Gary Mortenson, D.M.A., University of Texas–Austin.

Craig B. Parker, Ph.D., University of California, Los Angeles.

Reginald Pittman, D.M., Indiana University.

David Royse, Ph.D. , Kent State University.

Frank M. Sidorfsky, D.M.A., Eastman School of Music.

Jean C. Sloop, D.M.A., Eastman School of Music.

Mary Ellen Sutton, D.M.A., University of Kansas.

Frank Tracz, Ph.D., Ohio State University.

Rodney G. Walker, M.M.E., Wichita State University.

Program

Kansas State University's graduate program in music is designed to furnish specialized professional training supported by competence in those fundamental areas needed by all musicians. Emphasis is placed on the personal growth and development of the student toward individual goals. The program is large enough to provide ample variety yet small enough to allow personal attention to each student. While students are given considerable responsibility in all phases of the educational program, faculty guidance is constantly available.

The Department of Music offers the master of music with specialization in the following areas: performance, performance with pedagogy emphasis, theory-composition, music education, and music history/literature.

Facilities

The Department of Music is housed in a handsome auditorium building, opened in 1970, with extensive additions in 1974. Ample classrooms, rehearsal halls, practice studios, and offices are supplemented by a small hall for chamber music and an 1,800-seat auditorium. The department owns four concert grand pianos, several studio grands, and a number of well-maintained practice uprights. Organs include a concert Austin (40 rks), a Bosch tracker (9 rks), two Reuters (6 rks and 17 rks), and a Walker Continuo organ. An electronic studio centers around digital and analog synthesizers with ample supporting equipment. For the performance of early music, the department owns two harpsichords, a chest of matched viols, and assorted wind instruments.

The music division of Hale Library, located nearby, contains a growing reference and research collection fully adequate to master's level work, as well as an extensive collection of recordings. The Special Collections Division holds a number of rare items, from 16th century prints to one of the two largest collections of the manuscripts of Gail Kubik, world-renowned 20th-century composer. The graduate music seminar–study room offers a place in the music department in which materials may be placed on reserve for easy, convenient availability to graduate students.

Careers

In addition to enriching the quality of one's life, enhancing the understanding of other epochs and cultures, and providing outlets for self-expression, graduate study in music prepares students for a variety of professions. K-State's music alumni perform professionally with symphony orchestras, military bands, chamber music ensembles, opera and musical theatre companies, choral ensembles, jazz, rock, country, and bluegrass groups, in recording studios, and as soloists and accompanists. Others are active as composers of concert, commercial, liturgical, and/or educational music. K-State graduates also hold prominent positions in the fields of music education (pre-school through collegiate levels), private teaching, church music, music therapy, librarianship, and in the music industry. In addition, several K-State music graduates have used their arts degrees as preparation for professional schools such as law and medicine.

Ensembles, organizations, and concerts

A full range of performing organizations and small ensembles provides the graduate student with a variety of performance opportunities. In vocal music, these include the Concert Choir, the Chamber Singers, the Collegiate Chorale, the Collegium Musicum, and the Opera Theater and Workshop; in instrumental music, opportunities include Symphony Orchestra, Symphony Band, the Concert Band, the Concert Jazz Ensemble, and the Brass Ensemble. The Collegium Musicum provides performance of early music on authentic instruments. Chamber music flourishes in a number of small groups of various instrumentation. The McCain Auditorium Performance Series brings to the campus large musical attractions, world-famous soloists, and chamber music, as well as dance troupes and drama companies. Faculty recitals expand the opportunities to hear performances of professional caliber.

Degree options and requirements

Kansas State University offers the master of music degree with specialization possible in performance, performance with pedagogy emphasis, music education, theory-composition, and music history/literature. The degree requires a minimum of 32 credit hours including a master's report (or recital) or a master's thesis. Music education majors may elect to take 36 credit hours without master's report or master's thesis.

Core requirements

MUSIC 801. Introduction to Graduate Study. 2.

Theory and history–literature 11–12 hours, including Music 702 and at least one seminar course or MUSIC 767.

The Proficiency Examination will determine whether or not the student needs to take Music 601, Music 614, and Music 615.

See areas of specialization for further explanation. (MUSIC 802, taken during the summer, does not fulfill the seminar requirement.)

Requirements for individual areas of specialization

Performance

Admission: Each student wishing to major in performance must audition in person or send a recording of a recent concert. The audition or audition recording must be of substantial length and include music from three different style periods. The audition must be approved by the faculty of the appropriate division. Prospective conducting majors will take an examination in sight singing, score reading, and conducting methods.

Core requirements as above with the following amplifications:

History–literature hours must include:
For wind and percussion majors: 704
For conducting majors: 704 or 708
For string majors: 705
For voice majors: 706
For organ majors: 737
For piano majors: 738

Electives: 4 to 6 hours.

Major field: A minimum of 12 hours in the division of the student's major performance area, 8 hours of which must be individual instruction. The remaining 4 hours may be in pedagogy, methods, or ensemble. Voice majors who are found deficient in knowledge of foreign language diction will take 1 hour of diction.

Master's report (recital), 2 hours: All graduate students majoring in performance will perform a full recital of not less than one hour. The program for the recital must be approved by the student's advisory committee, and the advisory committee will judge the recital. All solo literature (including concertos) will be played from memory, unless the advisory committee grants an exception in recognition of unusual circumstances. The recital will be recorded and the recording bound, with supporting material, for presentation as a master's report. The student will also either (a) prepare substantial program notes of a historical and analytical nature, these notes to be bound with the recorded recital; or (b) present a lecture–recital on a major work not included on the master's recital, the lecture-recital to be recorded and bound with the master's recital. Under both options a and b, the project is to be done under supervision of the major professor or the director of graduate studies. The program notes or the lecture should demonstrate the student's ability to investigate and interpret the historical aspects of a work, to analyze style, and to use commendable English. The literary standards should be comparable to those required for the usual master's report. Under option b the student's choice of a work must be approved by his or her advisory committee.

Additional requirements and policies: students in areas in which ensemble performance plays an important role will be expected to take part in appropriate ensembles and organizations as determined in consultation with the student's advisory committee.

Performance with pedagogy emphasis
Differs from the performance specialization in the following:

Major field: 6 hours individual instruction; 3 hours Methods and Materials (MUSIC 828), including supervised practice teaching; 3 hours of Music 805.

Master's report (recital): Should the student choose to write program notes (option a), these should include discussion of the pedagogical problems and values of the works. Should the student choose to present a lecture-recital (option b), this should be a musically-illustrated presentation on some aspect of pedagogy in his or her field.

In place of a master's recital, the student may write a master's report in the field of pedagogy. The student choosing this option will also play the equivalent of a half recital for the faculty of his or her performance division and advisory committee.

History–literature
Core requirements: As above.

Performance: Collegium Musicum, 2 hours.

Major field: 12 hours minimum, excluding 601 and including at least 9 hours from 830, 832, 834, 836, and 837.

Master's report, 2 hours.
or
Master's thesis, 6 hours (this option is open by permission to history majors who are not required to take 601 and who have a special interest in research.)

Electives: 2 to 8 hours.

Additional requirements: Reading knowledge of foreign language; German or French preferred, Italian, Latin, Russian, or Spanish acceptable.

Oral examination, in defense of thesis or report.

Theory–composition
Admission: Entrance to the program normally requires at least 26 undergraduate hours of theory–composition courses. The applicant should submit original scores to the composition faculty for approval.

Core requirements: As above with the following amplification: MUSIC 837: Seminar in 20th-Century Music is required.

Performance: One course (2 hours) in advanced conducting or score reading.

Major field: Total, 16 hours, as follows: 10 to 14 hours, including 802 (Seminar in Music Theory) or 804 (Advanced Analysis), and individual instruction in composition; and master's report, 2 hours or master's thesis, 6 hours. The report or thesis may be either a theoretical paper or a composition in a larger form with an accompanying report.

Electives: Up to 6 hours.

Additional requirements and policies: The composition student must prove his or her proficiency in conducting and in electronic instrumentation, either by class study or by actual performance in the area.

All students receiving individual instruction in composition are required to copy their music in the prescribed professional manner.

Wherever possible, the composer should assume the responsibility of seeing to the performance of his or her own music.

Music education
Admission: An applicant in music education may arrange a personal audition or send a recording demonstrating ability in the major area of performance as part of the admission process. Those who do not do so will audition during the registration period.

Core requirements: Same as above.

Performance: 4 hours individual instruction in the major performance area of the student's undergraduate study, or in a chosen secondary performance area, or in advanced conducting.

Major field:
Music education core: 805 and 808, 6 hours.

Music education electives: 6–7 hours, from 809, 811, and 814; not more than 2 hours of 811 or 814 may be counted.

Master's report, 2 hours. With the approval of the student's advisory committee and the graduate faculty of the area concerned, the requirements may be satisfied by one of the following:

1. A scholarly paper on some aspect of the student's major area of teaching;

2. An original composition of acceptable proportions, with an accompanying report;

3. A recital on the student's major instrument, the recital to be given under the conditions listed under the performance major;

4. Six additional semester hours of graduate courses in music education and/or advanced courses related field, (e.g., art, drama, education, philosophy, psychology, statistics, etc.).

Master's report or thesis

The master's report should demonstrate the student's ability to locate and gather information, to organize this information, and to interpret and evaluate it. While the subject need not be taken from a totally unexplored area, the master's report should reflect originality of thought and approach, and it must represent essentially the student's own work. The report is written with the guidance of the major professor. The director of graduate studies is the second reader and should be consulted early in the work. The other member of the advisory committee also reads the report and should be consulted well before the work is finished.

The master's thesis differs from the report only in the broader scope and greater length required.

Both the thesis and the report must be in clear and commendable English. The form and style should follow Richard Wingell's *Writing About Music: An Introductory Guide*, second edition. (Music education majors will use the *Publication Manual of the American Psychological Association*, fourth edition, instead.) For discussion of the master's report (recital), see above under the performance specialization.

Final examination

All candidates for the master of music degree are required to take a final written comprehensive examination. The total time of the examination is approximately seven to eight hours.

The examination covers three general areas: the candidate's major field, history-literature, and theory. The emphasis is placed on material that has been stressed in the candidate's program of study. The candidate will be expected, however, to demonstrate breadth of knowledge in the field of music beyond that covered in course work, as well as the ability to relate his or her special area to other areas.

The responsibility for making up and evaluating the examination lies with the candidate's advisory committee. The final examination will be given twice during each semester, the dates to be announced no later that the second week of the semester.

Problems courses

Not more than three hours in MUSIC 799: Problems in Music should ordinarily be applied to the master's degree except that two hours of Problems in Music may be applied to the master's report. The purpose of the Problems in Music course is to provide opportunity for guided independent study in areas not included in regular course offerings. If scheduling difficulties have made it impossible for the student to take a needed or desired course, Problems in Music may be used to cover that subject matter.

Symposium in music and workshops

MUSIC 811: Symposium in Music and the other short, concentrated workshop courses, designed especially for school music teachers and supervisors, are given during the summer session. Often these are taught by visiting musicians and educators of national prominence. The symposium and various workshops carry graduate credit, but only 2 hours of these courses may be applied toward the master's degree. Further information may be obtained from Professor Jana Fallin, Department of Music, Kansas State University, 109 McCain Auditorium, Manhattan, KS 66506–4702.

Admission

Instructions for application will be enclosed with the application form, which the Department of Music will gladly furnish. The applicant should be sure that (1) each undergraduate or graduate institution previously attended sends one copy of the official transcript directly to the music department; (2) persons asked to write recommendations are told to send them to Dr. Craig B. Parker, Director of Graduate Studies, Department of Music, Kansas State University, 109 McCain Auditorium, Manhattan, KS 66506–4702; and (3) a statement of the applicant's personal and professional goals is included.

All new graduate students are required to take a physical examination. For students applying from within the United States this examination may be given by a family physician prior to enrollment and recorded on the forms furnished by the university. International students must submit a health certificate as part of their application and report to Lafene Health Center during enrollment for a physical examination.

International students whose native language is not English must present a score of at least 600 on the Test of English as a Foreign Language in order to be admitted to the graduate program in music.

Entrance requirements
To be considered for admission with full standing, the applicant must have:

1. A bachelor's degree from an approved institution.

2. Adequate preparation in the field of music: normally a B.M., B.M.E., B.S. in music education, B.A. in music, or the equivalent.

3. An undergraduate average of B or better in the junior and senior years.

If all of the foregoing requirements are not met, probationary admission may be considered provided there is other evidence that the applicant has the ability to do satisfactory graduate work. Such evidence might include a post-graduate record at another institution, scores on the Graduate Record Examination and/or the GRE Revised Music Test, or successful professional work.

Students may be admitted provisionally if there is uncertainty in evaluating transcripts.

Full standing for probationary or provisional students is attained automatically upon completion of at least 9 hours of work for graduate credit with a grade of B or better.

The Department of Music recommends, but does not require, that all entering students take the GRE Revised Music Test. This test is most helpful if taken early enough for the scores to be evaluated as part of the admission process. Outstanding scores on this examination might, in some cases, qualify a student for additional financial aid.

An application for admission to the Graduate School in the Department of Music ordinarily implies the student's intention to work toward an advanced degree. Students who do not plan to work toward an advanced degree, however, may be admitted as special students. Those who later wish to enter the degree program must undergo a full review. No more than 9 semester hours earned as a special student may be transferred into a regular degree program.

Admission to the Graduate School in the Department of Music does not necessarily imply admission to a particular program within the department. For special requirements, see the individual areas of emphasis.

Residence requirements
Graduate School regulations require that candidates for the master's degree spend one academic year or its equivalent in residence. Candidates in music, however, are seldom advised to attempt completion of the master's degree in less than two semesters and one summer. Candidates who serve as graduate assistants or hold positions outside of their academic responsibilities are generally advised to take four semesters. A summer session of six weeks may be regarded as slightly less than half a semester; a candidate whose work is confined to the summer, therefore, will usually require at least five summers, plus some independent work, for completion of the master's degree.

Transfer credit
Graduate credit may be transferred from other accredited institutions if the grade is a B or better. Transfer of more than 6 hours requires special action; in no case may more than 10 hours be transferred. Credits that were earned more than six years prior to the semester in which the program of study is approved cannot be transferred.

Course loads
No graduate student in music shall take more than 16 hours of credit in any semester. Six credit hours is considered a full load during the concentrated summer term. Graduate assistants may not take more than 12 hours in any semester and must take at least 6 hours.

Registration
Registration procedures are outlined each semester in the course schedule. First-term graduate students may be required to come a week before classes begin for orientation and testing. The needed information will be communicated to each student in ample time by the director of graduate studies.

All music graduate students will register through the office of the director of graduate studies in music.

Proficiency tests

Before registration for the first term, each entering graduate student will take proficiency tests. The written tests will consist of two sections, each section lasting approximately three hours.

1. Theory (a.m.)
a. Test of aural skills.
b. Harmonic analysis of a Baroque, Classic, or Romantic piano score.
c. Harmonization in free style from a lead sheet.
d. Composition of a three-voice fugue exposition.

2. History and literature (p.m.)
a. Style analysis. The student will discuss the style of several recorded selections and scores and will tell the approximate date of composition of each.
b. Short-answer, factual information-the names and dates of composers and compositions; terminology, general information.
c. Essays on selected historical topics.

3. Piano proficiency. This test is approximately the equivalent of piano proficiency requirements at most undergraduate institutions. It is designed as a test of the student's ability to use the instrument, not as a test of public performance.

The results of the tests will be used in planning the most suitable program for each individual. If remedial work is indicated, this may be accomplished either by taking the proper undergraduate course or by doing independent study before reexamination. In most cases, remedial work can be successfully done without extending the residence time needed to complete the degree.

Advisory committee

During the student's second semester, the director of graduate studies shall, in consultation with the student, appoint for each student a major professor. The major professor will then organize an advisory committee consisting of himself or herself as chair, the director of graduate studies, and at least one other faculty member.

The duties of the advisory committee will be (1) to meet in the student's second semester to review the student's work; (2) to meet with the student in the second term in order to formulate and approve the student's academic program; (3) to offer counsel and advice to the student throughout his or her academic career and to approve such changes in his or her program as are agreed upon; (4) to advise the student in the selection of a topic for the master's thesis or report, or the program for master's recital, and to approve the final choice; (5) to act as the final reading committee of the master's thesis or report or judging committee for the student's final master's recital; (6) to serve as the examining committee for the student's comprehensive examination.

The initial organization of the advisory committee and the scheduling of its first meeting shall be the responsibility of the major professor; thereafter, the student has the responsibility for consultation with members of his or her committee and for obtaining the approval of the committee on appropriate matters.

Student's program

During a student's second semester in Graduate School, each student will, at some time before preregistration for the following term, meet with his or her major professor and, in consultation with other members of his advisory committee, plan his academic program. This program is entered on the official form which the student receives from the Graduate School office. When each of the members of the advisory committee and the head of the music department have signified approval by signing the completed form, the student will make six copies and will deliver the original and all copies to the Graduate School office.

The student is then responsible for following the program through his academic career, for obtaining approval from his or her advisory committee for any desired or needed changes, and for seeing to it that his or her major professor registers such changes with the Graduate School.

Assistantships and financial aid

A limited number of graduate assistantships are available during the regular academic session. Assistantships are not available in the summer. These are given in specific areas, according to the needs of the department. Teaching assistants are normally needed in accompanying, bannd, collegium musicum, comprehensive musicianship, music appreciation, orchestra, piano class, and voice (class and/or studio teaching). Other assistantships involve work in the Music Library, the instrument room, and various aspects of administration.

Full-time graduate assistantships require up to 16–20 hours a week. Such an appointment pays $6,000, plus a full tuition waiver. Part-time assistants work 8 to 10 hours per week and receive a yearly salary of $3,000. Assistantships are awarded with the expectation that the student will spend two years in residence and that satisfactory performance of duties and satifactory academic work will bring renewal of the assistantship for a second year. Assistanships are generally not available for more than two years.

We welcome applications from well-qualified international students. In order for an international student to be considered for an assistantship, two requirements must be satisfied in order to demonstrate proficiency in English: a score of 600 or higher on the TOEFL and a score of 240 or higher on the TSE or at least 50 on the Revised TSE.

For students who are eligible, work-study may be available for a variety of jobs on the campus. Inquiries as to eligibiiity for work-study should be addressed to the Office of Student Financial Assistance, Kansas State University, Manhattan, KS 66506–1104.

Music courses

Graduate credit

Courses in music history, literature, and theory

MUSIC 570. Musicai Comedy. (3) On sufficient demand. The history of operetta and music comedy from Offenbach to the present. Offered jointly by Departments of Music and Speech. Same as THTRE 570.

MUSIC 601. Western Music Before 1750. (3) II, in alternate years, alternate S. A survey of the development of Western music from early Greek civilization to 1750. Pr.: MUSiC 398 and 406.

MUSIC 614. Harmony and Tonal Counterpoint. (1) I. Recommended for graduate students in music who need additional work in the harmonic aspects of 18th-century counterpoint. Concurrent enrollment in MUSIC 615 required.

MUSIC 615. Canon and Fugue. (2) I. Alternate S. Counterpoint in eighteenth century style. Pr.: MUSIC 398, consent of instructor.

MUSIC 616. Twentieth-Century Counterpoint. (2) II, S. Contrapuntal devices used by twentieth-century composers; serial techniques. Pr.: MUSIC 398, consent of instructor.

MUSIC 620. Music Calligraphy and Score Preparation. (2) On sufficient demand. Tools and procedures for professional preparation of music manuscript in facsimile editions. Computer applications for typesctting and music publishing. Pr.: MUSIC 201.

MUSIC 631. Technology of the Electronic Music Studio. (2) I, S. Instrumentation and systematic procedures as applied to the construction of electronic music. Principles of voltage-controlled systems, synchronous tape machines, and audio mixing. Individual and team projects. Pr.: MUSIC 521, consent of instructor.

MUSIC 632. Digitai Sound Synthesis. (2) On sufficient demand. Exploration of real-time interactive systems. Theory and application pertaining to the creation of instruments and scores using additive and FM techniques. Team projects. Pr.: MUSIC 631.

MUSIC 650. History of the Opera. (3) I, in alternate years. A study of selected masterpiccs of musical drama, with emphasis on the relationship of music and drama, and on the unique qualities of opera as a collective artwork. Pr.: MUSIC 201 or MUSIC 250.

MUSIC 702. Styie Anaiysis. (3) I, alternate S. Training in a comprehensive, systematic analytical approach to all stylc periods, and in verbalizing analytical perceptions. Pr.: MUSIC 407.

MUSIC 704. Symphonic Literature. (3) II, in alternate years. The development of orchestral music from the late Baroque to the present, with emphasis on selected symphonies of the late eighteenth and nineteenth centurics. PR.: MUSIC 407.

MUSIC 705. Chamber Music Literature. (3) II, in alternate years. A selected survey of masterpieces of small ensemble music from 1750 to the present. Special emphasis on the string quartet. Pr.: MUSIC 407.

MUSIC 706. Song Literature. (3) II, in alternate years. Survey, by historical period and national styles, of major solo vocal works. PR.: MUSIC 407.

MUSIC 708. Chorai Literature. (3) II, in alternate years. A study of standard choral masterpieces in both large and small forms from 1450 to the present. Pr.: MUSIC 407.

MUSIC 711. Practical Composition and Arranging. (2) On sufficient demand. Explanation of styles and techniqucs applicable to contemporary commercial music. Practical arranging for the stage band. Pr.: MUSIC 213 or consent of instructor.

MUSIC 714. Advanced Orchestration. (2) On sufficient demand. The study of orchestra and band scores. Exercises in orchestrating this type of music for different choirs of instruments, as well as scoring for full orchestra and symphonic band. Pr.: MUSIC 503 or consent of instructor.

MUSIC 737. Organ Literature. (3) I, in alternate years. A survey of significant compositions from the Renaissance to the present with emphasis on performance practice. Pr.: MUSIC 407.

MUSIC 738. Piano Literature. (3) I, in alternate years. Selective survey of music for piano from 1750 to the present. Pr.: MUSIC 407.

MUSIC 740. Studies in Music Literature. (3) On sufficient demand. Study of the repertory of a selected musical genre or medium of performance. Pr.: MUSIC 407.

MUSIC 766. Seminar in the Life and Works of an Individual Composer. (3) I, alternate S. Study of the career and achievements of a selected composer of major stature. Pr.: MUSIC 407.

MUSIC 767. Topics in American Music. (3) On sufficient demand. Studies of the various genres of American music. Pr.: Music 407.

MUSIC 799. Problems in Music. (Var.) I, II, S. Individual guided work in a selected area. No more than three hours of Problems in Music may be applied to the master's degree. Pr.: 6 hours graduate credit in music.

MUSIC 801. Introduction to Graduate Study in Music. (2) I, alternate S. Library procedures, bibliography, research methods, and practice in preparing scholarly papers. Required of all graduate students in music. Pr.: At least 30 hours of music theory and music history.

MUSIC 802. Seminar in Music Theory. (3) II, alternate S. Comparison of major theoretical treatises and historical compositional practices; practical application for the modern musician. Pr.: Twenty hours of music theory.

MUSIC 803. Seminar in Music History. (2) S. The history of music with emphasis on the correlation of stylistic factors and man's cultural environment. Pr.: MUSIC 407.

MUSIC 804. Advanced Analysis. (3) II, in alternate years. An in-depth study of works by later Romantic and modern composers: techniques and styles in relation to form. Pr.: Twenty hours music theory.

MUSIC 830. Seminar in Medieval and Renaissance Music. (3) II, in alternate years. In-depth investigation of a selected area or problem in medieval or Renaissance music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor.

MUSIC 832. Seminar in Baroque Music. (3) I, in alternate years. In-depth investigation of a selected area or problem in Baroque music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor.

MUSIC 834. Seminar in Classical Music. (3) II, in alternate years. In-depth investigation of a selected area or problem in classical music. Emphasis on individual research. MUSIC 601 and consent of instructor.

MUSIC 836. Seminar in Romantic Music. (3) II, in alternate years. In-depth investigation of a selected area or problem in Romantic music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor.

MUSIC 837. Seminar in 20th-Century Music. (3) II, alternate years, alternate S. In-depth investigation of a selected area or problem in twentieth-century music. Emphasis on individual research. Pr.: MUSIC 601, consent of instructor.

MUSIC 857. Advanced Composition. (1–2) I, II, S.

MUSIC 898. Master's Report in Music. (2) I, II, S. Independent directed research leading to master's report. Pr.: sixteen hours graduate credit in music.

MUSIC 899. Research in Music. (Var.) I, II, S. Independent research that may lead to master's thesis. Pr.: sixteen hours graduate credit in music.

Courses in music education

MUSIC 511. Music in the Schools, K–6. (4) II. The music curriculum in grades K–6, including a study of the musical characteristics of children and materials and techniques for teaching instrumental, vocal, and general music at this level. Pr.: Admission to teacher education and junior standing in music.

MUSIC 512. Music Program in Junior/Senior High Schools. (4) I. Organization and administration of the comprehensive music program in junior and senior high schools; including the study of vocal and instrumental ensemble development, as well as techniques and materials for other types of music classes. Pr: Admission to teacher education and junior standing in music.

MUSIC 670. Advanced Studies in Music Education. (2) I, II, S. Advanced undergraduate studies of various topics related to the teaching of music in grades K–12. May be repeated for credit when topics vary. Pr.: MUSIC 511 or 512.

MUSIC 805. Theories in Music Education. (3) On sufficient demand. A survey of the history of music teaching in the United States, with emphasis on the relationship of various theories of music, musical perception, and musical cognition to current practices in teaching music at all levels. Pr.: Nine hours graduate credit in music.

MUSIC 808. Research in Music Education. (3) II, alternate S. An introduction to historical, descriptive, and experimental research in music education, including a study of techniques for the evaluation of music teaching and learning. Pr.: MUSIC 805.

MUSIC 809. Seminar in Music Education. (3) I, alternate S. Advanced studies of various topics related to the instrumental, choral, and general music programs in elementary and secondary schools. May be repeated when topics vary. Pr.: MUSIC 805 or graduate standing in music education and consent of the instructor.

MUSIC 811. Symposium in Music. (1–3) S. Intensive short-term studies of various topics in music, featuring presentations by nationally known scholars in the field. Only two hours of Symposium in Music and Workshop in Music may be applied toward the master's degree.

MUSIC 814. Workshop in Music. (1–2) S. Advanced studies in specialized interest areas. Students may enroll in different areas simultaneously. Only two hours of Symposium in Music and Workshop in Music may be applied toward the master's degree.

Performance organizations

MUSIC 838. Opera Theatre. (Var.) I, II. Opera workshop for graduates. Pr.: Baccalaureate degree and previous experience at the undergraduate level.

MUSIC 839. Vocal Ensemble. (1) I, II, S. Performance and study with established University vocal organization or small ensemble.

MUSIC 840. Instrumental Ensemble. (1) I, II, S. Performance and study with an established University instrumental organization or a small ensemble.

MUSIC 841. Collegium Musicum. (1) I, II. An ensemble devoted primarily to the performance of music written before 1700. Authentic instruments used when possible.

MUSIC 842. Concert Choir. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level.

MUSIC 843. Symphony Orchestra. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level.

MUSIC 844. Concert Jazz Ensemble. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level.

MUSIC 845. Symphony Band. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level.

Performance classes

MUSIC 828. Methods and Materials for the Studio. (1–3) I, II, S. Methods of teaching fundamental techniques; selection of teaching materials outlining courses of study. For graduate students in performance curricula. Taught in divisions according to the major. Practical application through supervised studio teaching. Pr.: MUSIC 391 or MUSIC 492. May be repeated for a maximum of 3 hours.

MUSIC 859. Advanced Conducting. (Var.) I, II, S. Pr.: MUSIC 417 and consent of instructor.

MUSIC 885. Advanced Diction. (1) On sufficient demand. Concentrated study of Italian, German, and French diction for singing. Materials are related to work in the voice studio, and concurrent registration in MUSIC 855 is required. Pr.: MUSIC 466. May be repeated once.

Studio performance

MUSIC 641. Secondary Performance Area. (1–2) I, II, S. For graduate students who wish to study an instrument (or voice) other than the major performance area. Pedagogical methods and fundamentals are stressed.

MUSIC 855. Graduate-Level Performance. (Var.) I, II, S. Instruction is offered every semester in voice and each of the following instruments: baritone, bassoon, clarinet, double bass, early winds, flute, french horn, harpsichord, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, viola da gamba, violin, and violoncello. Students may enroll in more than one instrument simultaneously and may earn I to 4 hours per semester in each instrument.

For more information

For additional information and application materials please contact:
Dr. Craig B. Parker
Director of Graduate Studies
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Kansas State University
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Manhattan, KS 66506–4702
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Pathobiology

Director of graduate studies

Brad Fenwick

Graduate faculty

Gordon Andrews, DVM, Ph.D., Kansas State University; ACVP Diplomate.

J. Randall Basaraba, DVM, Ph.D., Washington State University; ACVP Diplomate.

Frank Blecha, Ph.D., Washington State University.

Deborah J. Briggs, Ph.D., Kansas State University.

Alan Brightman, DVM, M.S., University of Illinois.

M. M. Chengappa, DVM, Ph.D., Michigan State University; ACVM Diplomate.

Peter Chenoweth, BVSc, Ph.D., University of Queensland.

Shafiqul I. Chowdhury, DVM, Ph.D., Free University of Berlin.

Brad DeBey, DVM, Ph.D., Iowa State University; ACVP Diplomate.

Steve Dritz, DVM, Ph.D., Kansas State University.

Michael W. Dryden, DVM, Ph.D., Purdue University.

Bradley W. Fenwick, DVM, Ph.D., University of California; ACVM Diplomate.

Zhen Fang Fu, DVM, Agricultural University, China; Ph.D. Massey University, New Zealand.

Roman Reddy Ganta, Ph.D., All India Institute of Medical Sciences.

Jerry Gillespie, DVM, Ph.D., University of California, Davis.

Terry Johnson, B.S., M.S., Ph.D., University of Minnesota, Minneapolis.

Sanjay Kapil, DVM, Ph.D., University of Minnisota; ACVM Diplomate.

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George A. Kennedy, DVM, Ph.D., Kansas State University; ACVP Diplomate.

Harish C. Minocha, DVM, Ph.D., Kansas State University.

Puliyur S. MohanKumar, Ph.D., Kansas State University.

William E. Moore, DVM, Ph.D., University of Minnesota; ACVP Diplomate.

Derek A. Mosier, DVM, Ph.D., Oklahoma State University; ACVP Diplomate.

T. G. Nagaraja, MVSc, Ph.D., Kansas State University.

Jerome Nietfeld, DVM, Ph.D., Uiversity of Georgia; ACVP Diplomate.

Richard D. Oberst, DVM, Ph.D., University of California.

Frederick W. Oehme, DVM, Ph.D., University of Missouri; ABVT and ABT Diplomate.

John Pickrell, DVM, M.S., Ph.D., University of Illinois; ABVT.

G. R. Reeck, B.A., Ph.D., University of Washington.

Robert K. Ridley, DVM, Ph.D., Florida State University.

Jan Sargeant, MSc, Ph.D., University of Guelph.

Polly Schoning, DVM, Ph.D., Kansas State University; ACVP Diplomate.

George Stewart, Ph.D., University of Texas Health Science Center at Dallas.

Deryl L. Troyer, DVM, Ph.D., Kansas State University.

Jerome G. E. Vestweber, DVM, Ph.D., Kansas State University.

Melinda Wilkerson, DVM, Ph.D., Washington State University, ACVP.

Program description

The pathobiology graduate group of the College of Veterinary Medicine offers graduate programs leading to M.S., Ph.D., and combined DVM/M.S. degrees. The group offers Ph.D. degree programs specializing in microbiology, parasitology, pathology (anatomic and clinical), and toxicology. Requirements for the Ph.D. degree include approved courses (90 semester hours-78 for individuals with a D.V.M./V.M.D. degree-including at least 30 hours of research for the dissertation), a preliminary examination, and satisfactory defense of the dissertation at the final oral examination. The Ph.D. degree normally requires at least three years of full-time study. Demonstration of proficiency in foreign languages is not required. The university operates on a semester basis plus an eight-week summer session.

The M.S. degree is administered by individual academic departments and is offered in the same specialty areas as those for the Ph.D. degree. Minimum requirements for the master's degree are 30 semester hours (18 hours for individuals with a D.V.M./V.M.D. degree), including 6 to 8 hours of research. See Veterinary Medicine in this catalog for additional information.

Program requirements

Minimum entrance requirements, include a B average in the junior and senior undergraduate years for applicants not holding a D.V.M./V.M.D. degree. International students must demonstrate proficiency in English by earning a satisfactory score on the TOEFL and must provide health and financial certificates. Candidates for admission to the Graduate School must be approved by the faculty of the department or interdepartmental program.

Most incoming students have a degree in veterinary medicine, but some have degrees in animal science, microbiology, biology, biochemistry/pharmacology, genetics, or food science. The most important considerations for applicants are documented academic achievement and an interest in continued study and research in pathobiology. Sufficient training in biology and a strong background in biochemistry are important requirements. Application for admission to the program in a fall semester should be made in the preceding late fall or early winter.

Financial support

Assistantships and temporary assistant instructor positions are available for qualified candidates on a limited, competitive basis. Prospective students are encouraged to apply for federally sponsored fellowships and traineeships from agencies such as the USDA, NASA, NDEA, NIH, and NSF. Application information is available from the Dean of the Graduate School, Kansas State University, Manhattan, KS 66506.

Research facility

Housed in a spacious modern building complex with up-to-date equipment to provide excellent opportunities for graduate research. Major equipment include cell counters, an electron microscope, environmental chambers, cryostats, densitometers, fluorometers, chromatography equipment, high-vacuum evaporators, neurophysiological recording devices, recording spectrophotometers, spectrometers (atomic absorption, respiratory mass, scintillation), biohazard safety hoods, stereotaxic instruments, ultracentrifuges, ultramicrotomes, ultrasonic membrane destructors, flow cytometer and high-performance liquid chromatography units. Surgery and housing facilities for large and small animals, intensive library holdings and facilities, and easy access to the university's computer center are also available. Extensive research potential in food animals is enhanced by an interstate cooperative program with the University of Nebraska–Lincoln.

Pathobiology courses

DMP 650. Fundamentals of Public Health and Food Safety. (3) I. Organization and function of food inspection services; principles of disease transmission; diseases transmitted to humans through the food chain. (Jointly with HRIMD 650.) Pr.: BIOL 198.

DMP 705. Principles of Veterinary Immunology. (2) II. Innate and adaptive defense mechanisms in domestic animals. Topics include vaccinology, immunopathology, autoimmunity, immunodeficiency, and immunomodulation. Pr.: BIOCH 521 and BIOL 455.

DMP 708. Principles and Methods of Epidemiology. (2) II. Ecologic and epidemiologic concepts in the study of diseases in populations: epidemiologic methods emphasizing problem solving and application to epidemiologic principles of disease control. Pr.: DVM 700 and BIOL 455.

DMP 712. Veterinary Bacteriology and Mycology. (5) I. Morphology, biology, and classification of pathogenic bacteria and fungi and their relation to the causes of disease. Three hours rec. and six hours lab a week. Pr.: DMP 705 and BIOL 455.

DMP 715. General Pathology. (5) I. Etiology, pathogenesis, lesions, and termination of processes of disease, including inflammation, necrosis, regeneration, oncology, and disturbances of metabolism, circulation, and growth. Three hours lec. and six hours lab a week. Pr.: AP 700, AP 705 and AP 710.

DMP 718. Veterinary Parasitology. (5) I. Study of helminth, arthropod, and protozoan parasites of companion and food animals. Emphases are on diagnosis, clinical signs, lesions, treatment, control, epidemiology, and public health aspects of parasitic disease. Three hours lec. and six hours lab a week. Pr.: AP 710 and DMP 708; or consent of instructor.

DMP 720. Systemic Pathology. (5) II. Pathology of the organ systems of domestic animals including gross and microscopic study of lesions. Three hours lec. and six hours lab a week. Pr.: DMP 715.

DMP 722. Veterinary Virology. (3) II. Morphology, biology, and classification of viruses and their relation to the causes of disease. Two hours rec. and three hours lab a week. Pr.: DMP 705 and DMP 712.

DMP 753. Zoonoses and Preventive Medicine. (3) II. Bacterial, viral, parasite, and mycotic diseases shared by animals and humans. The role of the veterinarian in wholesomeness and quality assurance of foods of animal origin including regulatory requirements. Pr.: DMP 708.

DMP 759. Laboratory Animal Science. (2) II. Management and health of common species of laboratory animals. Pr.: DMP 715.

DMP 770. Fundamental Concepts in Emerging Pathogenic Diseases. (3) II, even years. Topics discussed will include why epidemics occurred historically, a review of the reasons for current emerging diseases and the potential for epidemics to occur in the future. Pr.: 3 hours of Biology above a 700 level.

DMP 775. Clinical Pathology. (3) II. Principles, application, and interpretation of clinical laboratory procedures, and experience with applicable techniques. Two hours lec. and three hours case discussion or lab a week. Pr.: DMP 705 and DMP 715.

DMP 777. Laboratory Diagnosis. (1) I. Laboratory techniques in hematology, cytology, bacteriology, mycology, urology, and clinical chemistry as applied to the diagnosis of animal diseases. Three hours of lab a week. Pr.: DMP 775.

DMP 780. Avian Diseases. (3) I. The prevention, diagnosis, and treatment of avian diseases. Pr.: DMP 720 and DMP 775.

DMP 785. Diagnostic Medicine. (2) I, II, S. Practical experience in diagnostic procedures in the laboratory and on postmortem examination. Pr.: Fourth-year standing in the College of Veterinary Medicine.

DMP 790. Introduction to Research in Laboratory Medicine. (6) I, II, S. Methodology to conduct research in laboratory medicine. A laboratory study to introduce the procedures to plan, conduct, and evaluate research in clinical pathology, microbiology, parasitology, immunology, or epidemiology. Students will develop a research proposal, including preliminary data, following the guidelines of a peer-reviewed granting agency. One hour rec. and twelve hours lab per week. Pr.: DMP 705, DMP 720, and DMP 777.

DMP 801. Toxicology. (3) I. Effects of harmful substances on the animal body. Emphasis placed on toxicologic principles and management of the poisoned patient. Three hours lecture a week plus three one-to three-hour field trips. Pr.: Third-year standing in the College of Veterinary Medicine, BIOCH 521, and AP 747.

DMP 803. Advanced Toxicology. (3–6) I, II, S. An advanced course in toxicology stressing independent problem-solving utilizing data bases and technical resources to identify toxicological concerns, to define the problem, to consider possible remedial alternatives, and to select and implement the most appropriate management and recommendations for correction and future prevention. May be repeated once per student. Pr.: Fourth-year standing in the College of Veterinary Medicine, or graduate students in toxicology.

DMP 805. Toxins in the Biological System. (2) I, in odd years. An advanced toxicology course concerned with the cellular land subcellular effects of various groups of toxins on the intact animal organism. Pr.: BIOCH 521, CHM 531 or 550, AP 770 or consent of instructor.

DMP 806. Environmental Toxicology. (2) II, in odd years. An advanced toxicology course concerned with the occurrence, biological effect, detection, and control of foreign chemicals in the environment. Pr.: Consent of staff.

DMP 807. Current Topics in Toxicology. (2) II, in even years, and summers. An advanced toxicology course providing in-depth examination of toxicological area of current relevance to and/or controversy on mammalian health. Specific topics will change from semester to semester. Student in Ph.D. programs may repeat the course. Pr.: BIOCH 521 and AP 747.

DMP 809. Problems in Toxicology. (Var.) I, II, S. Individual investigations into the interactions of chemical compounds with living systems. Pr.: DMP 801.

DMP 820. Rumen Metabolism. (3) II, in even years. Metabolism, absorption, digestion, and passage of nutrients in the rumen; factors affecting the environment of the rumen; certain aspects of rumen function and dysfunction; techniques used in rumen research. Three one-hour lectures a week. Pr.: ASI 318 and BIOCH 521 or 755.

DMP 821. Advanced Clinical Pathology Laboratory. (1) I, II, S. Practical training in advanced techniques of clinical chemistry and hematology used in a large clinical pathology laboratory. Three hours lab per week. Pr.: DMP 777.

DMP 849. Pathologic Technique and Diagnosis. (3) I, II. Practical experience in mammalian necropsy, avian necropsy, histologic techniques, and diagnostic laboratory procedures. Nine hours lab per week. Pr.: DMP 720.

DMP 851. Pathology of Body Fluids. (4) I, in even years. Alterations of the components of body fluids occurring in disease processes, and interpretations of these changes. One hour rec. and six hours lab per week. Pr.: DMP 777.

DMP 852. Histopathology. (3) I, S. Advanced general and systemic histopathology. Extensive microscopic evaluation of organ systems for degeneration, circulatory disturbances, inflammation and neoplasia. One hour lec. and six hours lab per week. Pr.: DMP 720.

DMP 853. Veterinary Exfoliative Cytology. (2) I, in odd years. Preparation, examination, and interpretation of aspiration, biopsies with emphasis on the recognition of inflammatory and neoplastic processes. Exfoliated material derived from various body fluids, tissues, and organs of the living clinic patient will serve as the basis of the study. One hour lec. and three hours lab a week. Pr. DMP 720 and DMP 775.

DMP 854. Veterinary Epidemiology. (2) I, in even years. Epidemiologic principles relative to infectious and noninfectious diseases transmissible from animals to humans, and application of these principles by use of case investigations. Pr.: DMP 708 and DMP 753.

DMP 856. Advanced Veterinary Parasitology. (3) II, in odd years. Structure, life cycle, pathology, immunology, public health significance, diagnosis, and treatment of protozoan and metazoan parasites of veterinary significance. One hour lec., one hour rec., and four hours lab per week. Pr.: DMP 718 or BIOL 625.

DMP 859. Surgical Pathology. (1–2) I, II, S. Practical experience in examining and processing surgical biopsy specimens and writing histopathological reports. Three or six hours lab per week. Pr.: DMP 852.

DMP 860. Pathogenic Mechanisms. (3) II, in odd years. Virulence factors of infectious microorganisms and the host response to infection. Topics include pathogenesis of human and animal diseases and mechanisms of immunity. One hour rec. and two hours lec. per week. Pr.: DMP 712 or BIOL 690.

DMP 861. Advanced Diagnostic Pathology. (3) I, S. Pathologic alterations of disease with emphasis on diagnostic characteristics. Nine hours lab per week. Pr.: DMP 852.

DMP 863. Advanced Principles of Pathology. (3) I. Disease and its effects with emphasis on etiology and pathogenesis; morphologic change will be correlated with changes in chemical composition and function. Two hours lec. and three hours lab per week. Pr.: DMP 720.

DMP 865. Diagnostic Veterinary Virology. (3) I, in odd years. Viruses associated with diseases of veterinary medical significance with emphasis on diagnosis. Clinical observations, pathogenesis, lesions, epidemiology, immunity, and control will be considered. One hour rec. and six hours lab a week. Pr.: DMP 722 or BIOL 730.

DMP 866. Pathology of Diseases of Laboratory Animals, Fish and Wildlife. (3) I, in even years. Pathology of diseases affecting laboratory animals, fish, and wildlife. Nine hours lab per week. Pr.: DMP 852.

DMP 867. Advanced Topics in Comparative Pathology. (1–3) I, II, S. Selected topics to assist pathology majors in their area of specialization. Pr.: DMP 852 and DMP 863.

DMP 870. Seminar in Pathology. (1) I, II. Oral report on topics in microbiology, parasitology, immunology, pathology, epidemiology, or microbial genetics. The report will include critical review of relevant literature; experimental design and methodology; and presentation and evaluation of data. For M.S. students.

DMP 871. Molecular Diagnostics of Infectious Diseases. (2–3) I. Review and evaluation of new, molecular-based diagnostic techniques for infectious diseases. Current literature will be used extensively as a course resource. Pr.: A 3 hour course in basic molecular biology.

DMP 877. Advanced Laboratory Diagnosis. (1–2) I, II, S. Practical training in evaluation, interpretation, and written description of selected clinical pathology case materials. Course may be repeated by pathology and microbiology majors for a maximum of four credit hours (M.S.) and eight credit hours (Ph.D.). Pr.: DMP 777.

DMP 878. Applications of Flow Cytometry. (1–3) I, II, S. Theory and practical experience in the use of flow cytometry in diagnosis and research. Pr.: Graduate standing.

DMP 880. Problems in Pathology. (1–6) I, II, S. Problems in pathology, pathological techniques, avian diseases, and diseases of laboratory animals, fish, and wildlife. For M.S. students. Pr.: DMP 720.

DMP 890. Veterinary Hematology. (3) II, in odd years. Morphology, physiology, and pathology of the blood of domestic animals. Emphasis is placed on the species variations and clinical application. Pr.: DMP 775.

DMP 898. MS Research in Microbiology. (1–6) I, II, S. Individual research in any of the fields of veterinary microbiology.

DMP 899. MS Research in Pathology. (1–6) I, II, S. Individual research in the pathology of animal disease. Pr.: DMP 720 and DMP 849.

DMP 925. Rumen Microbiology. (3) II, in odd years. Lecture dealing with the microorganisms of the rumen, their habitat, diversity, structure, interactions, and biochemical activities. Techniques for enumeration, isolation and identification of ruminal microorganisms. Pr.: BIOL 455.

DMP 935. Necropsy Diagnosis. (1–3) I, II, S. Necropsy procedures and diagnosis. May be repeated each semester by pathology majors for a maximum of 10 credit hours. Pr.: DMP 852.

DMP 947. Advanced Systemic Pathology I. (5) I, in odd years. Etiology, pathogenesis, gross and microscopic characteristics, and systemic effects of diseases of cardiovascular, respiratory, gastrointestinal, urinary, and endocrine systems. Two hours lec., one hour rec., and six hours lab per week. Pr.: DMP 852 plus fours credits of DMP 935.

DMP 950. Advanced Systemic Pathology II. (5) II, in odd years. Etiology, pathogenesis, gross and microscopic characteristics, and systemic effects of diseases of the skin, of musculoskeletal, genital, and nervous systems, and of special senses. Two hours lec., one hour rec., and six hours lab per week. Pr.: DMP 947.

DMP 965. Cellular and Molecular Pathology. (4) II. Biochemistry of the injured cell, relationship of intracellular parasitism to cellular metabolism, metabolic and genetic basis of inherited diseasc. Pr.: BIOCH 755 or BIOL 860.

DMP 970. Pathology Seminar. (1) I, II, S. Oral report on topics in microbiology, parasitology, immunology, pathology, epidemiology, or microbial genetics. The report will include critical review of relevant literature; experimental design and methodology; and presentation and evaluation of data.

DMP 980. Problems in Pathology. (1–6) I, II, S. Topics in pathology, clinical pathology, pathological techniques, avian diseases, and diseases of laboratory animals, fish, and wildlife. Pr.: DMP 720.

DMP 997. Postdoctoral Research. (1–6) I, II, S. Postdoctoral research in collaboration with a faculty member, involving projects in any area of pathology or microbiology. Pr.: Ph.D. degree.

DMP 998. Research in Microbiology. (1–6) I, II, S. Individual research in any of the fields of microbiology.

DMP 999. Research in Pathology. (1–6) I, II, S. Individual research in the pathology of animal disease. This work may form the basis for the Ph.D. dissertation. Pr.: DMP 849.

For more information

For additional information and application materials please contact:
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Philosophy

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Laurie Anne Pieper, Ph.D., University of California at Los Angeles.

Charles E. Reagan, Ph.D., University of Kansas.

Although Kansas State University does not offer a graduate degree in philosophy, the following courses are available for graduate credit and, when appropriate, may be used to support graduate degrees in other departments.

Philosophy courses

Undergraduate and graduate credit in minor field

PHILO 510. Symbolic Logic II. (3) On sufficient demand. An advanced study of logical systems and problems in logical theory. Pr.: PHILO 220 or PHILO 110.

PHILO 515. Philosophy of Religion. (3) II, in alternate years. A course designed to examine philosophically the basic concepts of religion, e.g., truth and faith, God and atheism, reason and revelation, morality and religion, evil, man, sin, salvation, eschatology. Pr.: One course in philosophy or consent of instructor.

PHILO 525. Social-Political Philosophy. (3) I or II. A combined systematic and historical examination of social and political philosophy from antiquity to the present. Pr.: One course in philosophy or consent of instructor.

PHILO 535. Philosophy of Law. (3) I or II. A study of problems about the nature of legal reasoning, relationship between law and morality, and the justification of legal

punishment. Pr.: One course in philosophy or consent of instructor.

PHILO 545. Philosophy of Economics. (3) I, II. An examination of the moral and conceptual foundations of modern economic systems. Considers such topics as the relations between "economics rationality" and the quality of life, the just distribution of wealth, the nature of property rights, and the value of technology in society. Pr.: One course in philosophy or consent of instructor.

PHILO 550. Philosophy of Social Sciences. I or II, in alternate years. An examination of the possibility of a science of human beings and of specific issues in the social sciences such as models and measurements, reduction, functional analysis, ideal types and axiomatization. For students in sociology, anthropology, political sciences, psychology, geography, and history. Pr.: One course in philosophy or consent of instructor.

PHILO 555. Ethical Theories. (3) I. A systematic survey of the major literature of moral philosophy, e.g., Plato, Aristotle, Hobbes, Kant, Mill, Moore, Prichard. Pr.: One course in philosophy or consent of instructor.

PHILO 560. Philosophy of Feminism. (3) I or II. An in-depth analysis of important recent feminist contributions to social and political philosophy, epistemology, aesthetics and ethics. Topics such as power, work, love, reproductive freedom, and education will be considered. Pr.: One course in philosophy or consent of instructor.

PHILO 570. Aesthetics. (3), on sufficient demand. A study of selected topics in aesthetics and the philosophy of art. Pr.: One course in philosophy or consent of instructor.

PHILO 575. Philosophy in Literature. (3) I or II. An examination of philosophical ideas encountered in selected writings of the world's great poets, novelists, essayists. Pr.: One course in philosophy and one in literature or consent of instructor.

PHILO 580. Existentialism. (3) I or II. A study of prominent thinkers in the existentialist tradition. Pr.: One course in philosophy or permission of instructor.

PHILO 595. Environmental Ethics. (3) II. This course explores humanity's ethical responsibilities to the natural world and examines the philosophical principles underlying controversies over the proper balance between development and wilderness, and the cultural and the natural. Pr.: One course in philosophy or consent of instructor.

Undergraduate and graduate credit

PHILO 600. Studies in Ancient Philosophy. (3) I. A detailed study of a selected philosopher or movement in the history of Greek and Roman philosophy. Pr.: PHILO 300.

PHILO 605. Studies in Seventeenth and Eighteenth Century Philosophy. (3) II. A detailed study of a selected philosopher, school, or problem drawn from the history of philosophy in the seventeenth and eighteenth centuries. Pr.: PHILO 301.

PHILO 610. Recent European Philosophy. (3) I or II. An examination of important issues and movements in twentieth century European philosophy. Emphasis upon existentialism and phenomenology. Pr.: Two courses in philosophy.

PHILO 620. The Development of Analytical Philosophy. (3) I or II. The history of analytical philosophy in the first four decades of the twentieth century. A study of the work of Moore, Russell, the early Wittgenstein, and the logical positivists. Pr.: One course in philosophy.

PHILO 625. The Philosophy of Language. (3) I or II, in alternate years. Philosophical problems concerning the nature of language and such concepts as meaning and truth. Pr.: PHILO 110 or PHILO 220.

PHILO 630. Recent British-American Philosophy. (3) I or II, on demand. A detailed study of selected philosophical writings of current interest in Great Britain and the United States. Pr.: Two courses in philosophy.

PHILO 635. Metaphysics. (3) I or II, in alternate years. A critical examination of theories about things and their qualities, causality, space, and time. Both traditional and contemporary sources may be used, but emphasis will be placed on the latter. Pr.: One course in philosophy.

PHILO 640. Epistemology. (3) I or II, in alternate years. An examination of philosophical problems about the nature of our knowledge of the world. Pr.: One course in philosophy.

PHILO 645. The Philosophy of Science. (3) I or II, in alternate years. Philosophical problems concerning science, its methods, laws, and theories. Pr.: One course in philosophy.

PHILO 650. Philosophy of the Social Sciences. (3) I or II, in alternate years. An examination of the possibility of a science of human beings and of specific issues in the social sciences such as models and measurement, reduction, functional analysis, ideal types, and axiomatization. For students in sociology, anthropology, political science, psychology, geography, and history. Pr.: One course in philosophy or consent of instructor.

PHILO 655. The Philosophy of Mind. (3) I, in alternate years. The philosophy of psychology. An examination of philosophical problems about such psychological concepts as mind, consciousness, thinking, emotion, and dreaming. Pr.: One course in philosophy or consent of instructor.

PHILO 660. Advanced Ethics. (3) I or II. Detailed examination of selected topics in contemporary ethical theory. Pr.: PHILO 555.

PHILO 680. Problems in Philosophy. (Var.) I, II, S. Independent study for qualified students. Pr.: Background of courses required for problem undertaken.

PHILO 701. Topics in Metalogic. (3) On sufficient demand. Selected topics in the analysis of first-order theories and the foundations of mathematics. Pr.: PHILO 510 or MATH 511.

For more information

Home page: http://www.ksu.edu/philos/

Physics

Head

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Director of graduate studies

Michael J. O'Shea

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Jingyu Lin, Ph.D., Syracuse.
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Bharat Ratra, Ph.D., Stanford
Neville W. Reay, Ph.D., Minnesota.
Patrick Richard, Ph.D., Florida State.
Ronald A. Sidwell, Ph.D., Indiana.
Christopher M. Sorensen, Ph.D., Colorado.
Noel R. Stanton, Ph.D., Cornell.
Martin Stockli, Ph.D., Swiss Federal Institute of Technology.
Uwe Thumm, Dr. Ron. Nat., Freiburg, Germany.
O. Laurence Weaver, Ph.D., Duke.
Gary M. Wysin, Ph.D., Cornell.
Dean A. Zollman, Ph.D., Maryland.

Program description

The research programs of the Department of Physics are focused in the areas of atomic physics, condensed matter physics, educational physics, computational physics, and high energy physics. We have concentrated our major research commitments in these areas to maintain strength and balance. The Department of Physics offers graduate programs leading to the Ph.D. degree. These are described here with the research interests of the faculty. Our graduate core curriculum is an excellent foundation for work in a large variety of specialties.

Program requirements

For admission to the graduate program, a bachelor's degree in physics, a minimum upperclass GPA of 3.0, and the results of the GRE advanced test in physics are required. Candidates with degrees in mathematics, chemistry or engineering will also be considered. Students from non-English speaking countries are required to show proficiency in English via the TOEFL exam. The minimum acceptable score for admission is 550 (213 for the computer based GRE).Applications for admission to the program in the fall semester should be completed by February 15.

Careers

Graduate study in physics provides training for many varied academic and technological careers. Graduates in physics at all levels have found attractive careers in industrial and governmental laboratories and in academic departments. Graduates from K-State are presently engaged in communications research, x-ray laser development, genetic research, university teaching and research in various areas of physics, petroleum research, and industrial electronics, and many other fields. M.S. graduates generally occupy skilled technical positions and Ph.D. graduates generally occupy positions requiring independent work in a wide range of areas.

Research facilities

The experimental atomic physics research is based in the James R. Macdonald Laboratory, which is a DOE funded national user facility attached to the physics building. The JRM lab contains a 7.5-million-volt Tandem Van de Graaff accelerator coupled with a superconducting linear accelerator, an Electron Beam Ion Source (EBIS), and an Electron Cyclotron Resonance Ion source (ECRIS). With these facilities it is possible to prepare fully stripped ions of atoms from hydrogen to chlorine at all energies between 100 eV and 200 MeV. The laboratory is well equipped with magnetic and electrostatic devices, various

particle and photon detectors, and high-power pulsed and CW lasers. Data acquisition and analysis are done using three microVax's, one Vax 8250 work station system, and four VAX Stations 4000 connected in a cluster network.

Semiconductor material fabrication and device processing include: a variable pressure MOCVD system for the epitaxial growth of III-nitrides (GaN, InGaN, AlGaN); an inductively coupled plasma (ICP) dry etching system; an electron-beam lithograph system; and a photolithograph system. The semiconductor laboratory also possesses the world's only picosecond time-resolved laser spectroscopy system for semiconductor research with excitation and detection capabilities expanding from IR to deep UV (1.7 micro-meter to 0.195 micro-meter). The laboratory is also equipped with other facilities including a variable temperature (10 K - 650 K) Hall-effect, measurement system.

Facilities for magnetic research include a computer controlled sputter system with three sputter guns, a shared x-ray facility with the Department of Chemistry, a SQUID magnetometer to measure magnetic moment (1.8 - 400 K, applied magnetic fields up to 55 kOe) and a high temperature vibrating sample magnetometer (300 K - 800 K, applied magnetic fields up to 21 kOe). Electron microscopy facilities are also available at K-State and are used regularly by physics faculty.

Facilities for the study of liquid interfaces and layers include phase modulated ellipsometry and a recently developed ellipsometric microscope which possesses submonolayer thickness resolution and micron spatial resolution.

A light scattering laboratory is used for study of liquids, aerosols and particulates. Dynamical properties, growth of particles and fractal geometry are studied.

The high energy physics group operates a 520 square foot clean room with probe station and wire bonder for silicon detector test and fabrication. Further space and facilities for detector development exist in the physics high bay building. The K-State–HEP group also makes extensive use of the Electronics Design Laboratory. In addition, the group operates two high performance PC computing networks running the NT and Linux operating systems.

The physics department has a cluster of high-end and low-end SUNSparc and SUN Vectra SPARC workstations connected via the ethernet. Additionally, a consortium of faculty are part of the Center for Scientific Supercomputing which provides the local backbone for high performance computing through its 48 processors of the HP/Convex Exemplar S-class and V-class machines which are housed in Cardwell Hall. Cardwell Hall is connected via fast switches with large bandwidth to the Internet and Internet 2. Kansas State University is also part of the Great Plains Network (GPN), a six-state consortium of state networks and research universities, for the purpose of providing high performance interconnectivitiy among GPN sites and to provide high bandwidth access to Internet 2. Researchers in the physics department have easy access to all national supercomputer centers.

Financial support

The department is continually awarded outside support for research and teaching. The extramural research support for the department was $5.9 million in 1998. This support is important for the graduate student because it is an indication that the research conducted by the department is regarded highly by the research peers who review the department's proposals. It also indicates that a large number of graduate research assistantships are available in the department. Exceptional students can compete for university graduate fellowships and graduate fellowships offered by the Graduate School. Applications must be completed by January 15 to be considered for a fellowship. The schedule for teaching assistants is about 8 to 10 hours per week in laboratory sections in the introductory physics courses. Summer appointments as research assistants are generally available. The stipend is sufficient for a comfortable life in Manhattan.

Research areas

Experimental atomic physics

The experimental atomic physics group is involved in a diverse program which investigates the interaction of highly-charged ions with various target media. The ions are created as beams by the several available ion sources and accelerators located in the J. R. Macdonald Laboratory for atomic physics. The characteristics of the ion beams used in the experiments are that they have a well-defined charge state and energy and are thus ideally suited to investigating the behavior of collisions under a variety of well-defined conditions. Facilities include a 7 Mega-volt Van de Graaff accelerator, a superconducting Linear Accelerator (LINAC), an Electron Beam (EBIS) and an Electron-Cyclotron Resonance (ECRIS) Ion Source. Single electron and multi-electron atomic processes are investigated by observing the final ionic species and their decay products. The targets in these collisions consist of ground state and laser-excited atoms, as well as molecules. The results of these observations are compared to the theoretical predictions made by the K-State theory group as well as by theorists elsewhere. The close interplay between theory and experiment often leads to a better understanding of the collision and decay processes and in some cases suggest new phenomena or the need for new types of experiments or improved calculations. The combination of strong groups in theory and experiment within the same department makes K-State a leading atomic physics group in the world. Because of this, we have collaborations with researchers from around the world, who come to K-State to carry out their experiments.

Experimental condensed matter physics

The experimental condensed matter group at K-State is doing research on a wide range of often inter-related topics.

Research on condensed phases include the physics of aggregates, their optics (scattering and absorption), morphology, how they form and how they move; particularly in the context of aerosols, synthesis and properties (magnetic and optical) of nanoparticles and their assemblies (such as superlattices and gels) and of water, especially supercooled, and aqueous solutions. Phase transitions at liquid surfaces and within multilayer liquid films are being studied via optical techniques in order to better understand the physics at the boundaries of bulk materials. Surface structure is strongly influenced not only by the interactions at interfaces but also by any phenomena which is occurring in the adjacent bulk medium. We have therefore been studying (1) the coupling between bulk second order phase transitions and surface phenomena where we have observed universal surface critical behavior in both semi-infinite systems and within thin films and (2) surface interactions and how these influence and govern surface phase transitions and surface dynamics on a molecular level. A more complete understanding of surface phenomena will be of benefit for many important technological and biological processes, such as, surface chemical reactions, lubrication, and fluid flow through biological membranes or porous media.

Magnetic work is in the area of magnetic nanostructures such as nanoscale particles and much of it focuses on materials containing rare-earths. Making materials small modifies their properties in a number of interesting ways and this work is looking at how permanent magnet properties of Nd2Fe14B and other permanent magnet materials are modified. Our effort can be divided into two areas: (1) how can the hard magnetic properties of permanent magnets (coercivity, energy product) be improved by preparing these materials in very small form, (2) how can the observed modifications due to small size and the large amount of interface explain the observed modifications.

Semiconductor research within the condensed matter physics group focuses on III-nitride wide bandgap semiconductors, GaN, AlGaN, and InGaN. These semiconductors are recognized as important technological material for the fabrication of optoelectronic devices operating in the blue/UV spectral region and electronic devices capable of operating under high power and high temperature conditions. Our effort can be divided into four areas:

(1) Optical studies. Our objectives are to investigate the mechanisms of optical transitions and their dynamic processes and to study the physics components of nitride-based optoelectronic devices. (2) Transport studies. Our objectives are to study the mechanisms of p-type doping and properties of deep level impurities in GaN and AlGaN epilayers and the electronic transport properties in two-dimensional electron gas system in AlGaN/GaN heterostructures. (3) Materials growth by MOCVD. Our materials growth effort is focused on the growth of GaN and AlGaN epilayers, AlGaN/GaN heterostructures, and GaN/AlGaN multiple quantum wells. (4) Device fabrication. Our effort is focused on the III-nitride micro-size optoelectronic devices, including micro-disks, micro-rings and micro-pyramids. Our objective here is to develop a knowledge base for future optoelectronic devices based on III-nitrides, in particular for UV/blue micro-size LEDs, microcavity LEDs, microcavity lasers, and vertical cavity surface emitting lasers. The physical realization microstructures devices based on GaN, AlGaN, and InGaN epilayers, heterostructures, and multiple quantum wells is achieved by e-beam- and photo-lithographic patterning and advanced inductively-coupled-plasma etching technique.

High energy experimental physics
The HEP group consists of 15 members which include faculty, postdoctoral research associates, graduate and undergraduate students, technicians, a computer systems administrator, and an administrative assistant. Its strong research focus on neutrino and heavy quark physics has recently been extended to physics with the D0 detector at Fermilab's Tevatron, the world's highest energy particle accelerator.

K-State is a leader in the effort to build the silicon vertex detector for Run II of the D0 experiment, expected to begin taking data in early 2001. The group is currently seeking new graduate students to help exploit the exciting physics opportunities of D0. Group members are also analyzing data from NuTeV, a high precision deep inelastic scattering neutrino experiment, and DONUT, an experiment that is searching for direct production of the tau neutrino.

Theoretical and computational physics
The department offers a diversified program in theoretical and computational physics, including atomic, solid state, molecular and surface physics, statistical mechanics and cosmology. There is significant interaction between experimentalists and theorists within the department and there is also collaboration with faculty in chemistry, biochemistry and engineering. Seminars are held weekly in several of these areas. A broad range of computational facilities is available in our department with the main computations being carried out using the Departmental cluster of high-end and low-end SUN ultra SPARC workstations and the high performance computational environment provided by 48 processors of the Hewlett Packard/Convex Exemplar S-class and V-class machines.

There is strong national and international collaboration with other colleagues. We have a steady exchange with scientists in Germany, Japan, Argentina, England, France, Spain, China, India, Taiwan, Pakistan, Italy, Brazil, and Denmark. We participate actively in conferences ranging from regional to international. Professors, graduate students and post-doctoral fellows all take part in these meetings. Some studies of mathematical methods in physics have also been carried out by our faculty and graduate students. These include: studies in group theory with application to atoms, molecules, and nuclei; development of the method of hyperspherical coordinates; and development of complex integration with application to Coulomb wavefunctions. Mathematical aspects of formulations of the few-body and many-body problem have also been developed in our department.

Theoretical atomic physics
In atomic physics, a broad range of topics in both scattering theory and atomic structure are studied. These studies often are initially motivated by the need to understand experimental results; they provide broader perspectives on electronic interactions in atoms which are then further tested in experiments. Theoretical models for collisions of ions, electrons and photons with atoms, molecules, over a broad range of energies are being developed to understand the transfer of energy and momentum among the collision partners. These studies are developed to understand the results of experiments performed at K-State and at other laboratories. The study of atomic structure covers a detailed mapping of the de-excitation of atoms and ions produced in such collisions. Our studies of multiply excited states of atoms using hyperspherical coordinates are revealing the similarity between the collective electronic excitations of atoms and the rotational-vibrational modes of polyatomic molecules. Our investigations of interactions of ions (atoms) with surfaces and clusters (such as C60) contribute to a better understanding of corrosion, catalysis, and the still new field of fullerene chemistry.

Theoretical condensed matter physics
Condensed matter physics deals with a number of interdisciplinary areas with the goal of understanding the microscopic and macroscopic physical processes that control the behavior of solids and other condensed phases under varying external conditions. The types of systems studied in our group include liquid crystals, polymer mixtures and block copolymers, metals and semiconductors, surfaces, nanocrystallites and nanostructures, chemisorbed gases, magnetic layers, and fine magnetic particles. Germane to the pursuit of condensed matter theory is understanding how the interactions between the constituent atoms and molecules determine the physical and chemical attributes of materials. Condensed matter theory makes it possible to model or predict properties of fundamental importance, such as optical, magnetic, electronic and physical properties. The ultimate goal is then to use this understanding at the fundamental level to describe phenomena of technological importance, such as corrosion, catalysis, wetting, phase changes, magnetic data storage, friction and nanotribology, and especially, apply this new knowledge to the development of novel materials and devices in collaboration with experimentalists.

Theoretical tools employed in this pursuit include phenomenological model calculations, ab-initio electronic structure calculations based on density functional theory, and statistical mechanics formulations, including simulations of classical Monte Carlo and quantum molecular dynamics. Our theorists make great use of computer calculations that "simulate" the laws of physics for "models" of these condensed matter materials. In this ever increasing field of "computational physics" they use computer memory elements to represent the atoms and design programs that simulate their interactions. The output of these calculations allows the theorists to visualize realistically the microscopic processes and gain insight about the cause and modification of material properties and phenomena.

Cosmology and particle astrophysics
The K-State cosmology group focuses on developing and testing models for the large-scale matter and radiation distributions in the universe. Of particular interest are the predictions these models make for the cosmic microwave background radiation (CMBR) anisotropy, and the analysis of CMBR anisotropy data sets from the NASA COBE satellite and ground- and balloon-based observations. Other interests include inflation, dark matter, the classical cosmological tests, cosmological simulations of low- and intermediate-redshift large-scale structure, and cosmological magnetic fields.

Computational physics
Computational physics is being developed along with the solution of theoretical problems. Students are trained in accurate and efficient solution of problems in physics using a wide range of computational techniques. An equally important technique is the presentation of problem solutions in a way that can be easily visualized and understood. A number of faculty members and their students use supercomputers in their work, in addition to facilities housed on our own campus. Various algorithms for molecular dynamics simulation, Monte Carlo methods, ab-initio electronic structure calculations and solutions of generalized Langevin equations are being developed. A strong focus in this area is in the development of efficient algo-

rithms to best exploit the benefits of parallel architecture in modern computers.

Physics education

The physics education research group at K-State investigates and develops ways to improve physics teaching. In recent years the work of this group has concentrated on the development of learning materials for the high school and college level, the use of modern technology, and the training and support of science teachers, and research on student difficulties in learning physics. A major component of the education group's research focuses on integrating recent scientific advances into the education of non-science students. The faculty and students are using a combination of hands-on activities, interactive computer visualizations and written materials to introduce quantum physics and its applications to students ranging from high school to college undergraduate. The development of the materials is coupled with research on student understanding of contemporary topics. The result is a set of learning activities which utilize modern technology and is based on an understanding of how students learn.

Physics courses

Undergraduate and graduate credit

PHYS 562. Introduction to Quantum Mechanics. (3) I. An introduction to quantum mechanics: wave mechanics, one-dimensional solutions, perturbation theory, time-dependent perturbation theory, the one electron atom. Pr.: PHYS 522, 551; MATH 240.

PHYS 616. Advanced Physics Laboratory. (1–3) I. The completion of experiments in addition to those completed in Physics 506. Six hours of lab per week. Pr.: PHYS 506 and senior standing.

PHYS 620. Teaching University Physics. (3) in alternate years. A discussion of techniques which will aid in the development of understanding the concepts in physics. Emphasis is placed on models of learning and teaching techniques which can be applied to the teaching of contemporary physics to university students. These models and techniques are used to analyze a teaching approach of topics, such as quantum mechanics, which is important to today's physicist. Three class hours per week. Pr.: PHYS 562.

PHYS 623. Oscillations, Waves, and Relativity. (3) I, in alternate years. A study of the theoretical aspects of linear and non-linear oscillating systems and the theory of special relativity. Topics include periodic motion, coupled oscillations, Fourier analysis, mechanical and electromagnetic waves. Special relativity is introduced through its foundation in electromagnetism. Pr.: PHYS 472, 522, and 532.

PHYS 636. Physical Measurements Instrumentation. (4) II. A laboratory-oriented course to acquaint students with electronic circuits, their interfacing with measuring instruments, and their use in making physical measurements. Two hours lec. and six hours lab a week. Pr.: PHYS 214.

PHYS 639. Computations in Physics. (3) II, in alternate years. An introduction to applying computational and numerical techniques to solve problems of interest to physicists. Topics include the application of computational analysis and solution to physical problems in both classical, and quantum physics including particle structure and motion, interaction of particles with fields, and model building for simulation of physical phenomena. A practicum is an integral part of the course. Students will use both personal computers and advanced workstations. One hour lecture, two hours of computer lab per week. Pr.: PHYS 472.; one physics course at the 500 level; and a working knowledge of FORTRAN, BASIC, C or Pascal computer language.

PHYS 642. Nuclear Physics. (3) An introduction to the structure of the nucleus, radioactivity, and nuclear energy; the application of quantum mechanics to describe nuclear physics. Offered on sufficient demand. Pr.: PHYS 562.

PHYS 651. Introduction to Optics. (3) I, in alternate years. Introduction to modern concepts in optics: electromagnetic waves, propagation of light through media, geometric optics of lenses and mirrors, interference, coherence, Fraunhofer and Fresnel diffraction. Three hours of lecture a week. Pr.: PHYS 214.

PHYS 652. Applied Optics and Optical Measurement. (3) II, in alternate years following PHYS 651. Topical approach oriented toward measurements including coherence, Fourier Optics, holography, light scattering, interferometry, laser technology. Three hours of lecture per week. Pr.: PHYS 651.

PHYS 655. Physics of Solids. (3) I, in alternate years. An introduction to the physics of solids with an emphasis on energy band structures, electrical and optical properties of solids and solid state devices. Three hours of lecture per week. Pr.: PHYS 562.

PHYS 691. Introduction to Astrophysics. (3) II, in alternate years. An introduction to the application of physical principles to understanding astronomical objects. Topics include properties of stars, stellar evolution, galaxies, and cosmology. Three hours of lec. per week. Pr.: PHYS 325, 522, 532.

PHYS 692. Introduction to Cosmology. (3) II, in even years. An introduction to the physics and astrophysics of the hot big bang model to the Universe. Three hours lecture a week. Pr.: PHYS 522.

PHYS 694. Particle Physics. (3) II, in alternate years. An experimental and phenomenological introduction to high energy physics. The course will emphasize understanding the experimental basis of what is known about the subnuclear domain. Students will be asked to design simple conceptual experiments in addition to solving problems. Three hours of lec. per week. Pr.: PHYS 562.

PHYS 701. Cosmology. (3) I, in even years. A general-relativity-based discussion of the physics of the hot big bang model of the Universe. Pr.: PHYS 692.

PHYS 707. Topics in Physics. (Var.) I, II, S. Special topics courses. Topics and credits announced for the semester in which offered. May be given in conjunction with lecture series by visiting scientists. Pr.: Graduate standing or senior standing and consent of instructor.

PHYS 709. Applied Quantum Mechanics. (3) I. A study of Schrödinger's theory of quantum mechanics and its application to one electron atoms, multielectron atoms, quantum statistics, spectra of molecules and selected topics in quantum excitations of solids, nuclear physics, and elementary particles. Three hours of lec. per week. Pr.: PHYS 562.

Graduate credit

PHYS 800. Problems in Physics I. (1) II. Independent study of the solution of advanced problems in physics at a level appropriate to the M.S. degree. Pr.: Graduate standing and consent of instructor.

PHYS 801. Mathematical Methods of Physics. (3) I. Mathematical techniques for the solution of physical problems. Mathematical topics employed include vector and tensor analysis, matrices, group theory, complex variable theory, differential equations, Sturm-Liouville theory, orthogonal functions, special functions, Fourier series, integral transforms, and the calculus of variations. Pr.: PHYS 621.

PHYS 802. Computational Methods in Physics. (4) II. Methods of solving physical problems using digital computers including numerical differentiation and integration, error analysis and curve fitting, interpolation, ordinary and partial differential equations, matrix operations, eigenvalues, special functions of mathematical physics. Monte Carlo simulations, and stability of solutions; a practicum is an integral part of the course. Two hours lec. each week, practicum self-paced. Pr.: CIS 580, CIS 675 or MATH 655, PHYS 801, and a working knowledge of FORTRAN.

PHYS 806. Journal Club. (Var.) I. Seminar in current topics in physics. Pr.: Graduate standing in physics.

PHYS 807. Graduate Physics Seminar. (1) I, II. Lecture by faculty and graduate students on topics of current research interest. Pr.: Graduate standing in physics. May be repeated.

PHYS 808. Advanced Problems. (Var.) I, II, S. Independent study in a special problem in physics at the graduate level chosen with the advice of a faculty mentor. Pr.: Graduate standing and consent of instructor.

PHYS 811. Quantum Mechanics I. (3) II. Pr.: PHYS 562, 801.

PHYS 821. Advanced Dynamics. (3) II. Pr.: PHYS 801.

PHYS 831. Electrodynamics I. (3) I, in alternate years. Pr.: PHYS 532.

PHYS 841. Lasers and Quantum Optics. (3) The theory of lasers and laser-matter interactions: rate equations, line broadening, mode structure, Q-switching, three and four wave mixing, linear and stimulated light scattering. Pr.: PHYS 562 or equiv.

PHYS 850. Theory of Atomic Structure and Atomic Interactions. (3) I, in alternate years. The quantum mechanics of atomic structure and spectra: one and two electron atoms, many electron atoms, molecular structure and spectra, atomic collision theory for electron-atom and ion-atom collisions. Pr.: PHYS 562.

PHYS 860. Electron and Ion Impact Phenomena. (3) II, in alternate years. Atomic collision phenomena; experimental techniques in accelerator-based atomic physics; charged particle and photon spectroscopy; elastic, inelastic, and rearrangement collisions; and applications. Pr.: PHYS 562.

PHYS 881. Introduction to Solid State Physics. (3) I, in alternate years. Introduction to the physics of condensed matter: crystal lattices; lattice dynamics; electron energy bands; fermi surfaces; optical, magnetic, and transport properties of insulators, semiconductors, and metals. Pr.: PHYS 562 or conc. enrollment.

PHYS 899. Research in Physics. (Var.) I, II. S. Master's level research. Pr.: Consent of instructor.

PHYS 907. Advanced Topics in Physics. (Var.) Critical studies of selected advanced topics. Pr.: Comparison of graduate introductory courses in the field of study or permission of the instructor.

PHYS 910. Problems in Physics II. (1) Independent study of the solution of advanced problems in physics at a level appropriate to the Ph.D. degree. Pr.: PHYS 800 and consent of instructor.

PHYS 911. Quantum Mechanics II. (3) I. Pr.: PHYS 811.

PHYS 912. Advanced Quantum Mechanics. (3) Relativistic quantum mechanics; scattering theory; second quantization and the many-body problem; introduction to quantum electrodynamics. Pr.: PHYS 911.

PHYS 913. Advanced Topics in Mathematical Physics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 801.

PHYS 914. Quantum Field Theory. (3) On sufficient demand. Pr.: PHYS 911.

PHYS 931. Electrodynamics II. (3) II. Pr.: PHYS 831.

PHYS 953. Advanced Topics in Atomic Interactions. (Var.) Critical studies of advanced topics in atomic interactions. Pr.: PHYS 562.

PHYS 971. Statistical Mechanics. (3) I. Pr.: PHYS 562, 671, 821.

PHYS 981. Solid State Physics. (3) II, in alternate years. Continuation of PHYS 881. Quantized lattice vibrations, methods of band structure calculations, effective mass formulations, applications to optical absorption, excitons, magnetism, and superconductivity. Pr.: PHYS 811, 562.

PHYS 982. Advanced Topics in Solid State Physics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 782.

PHYS 999. Research in Physics. (Var.) I, II. S. Doctoral level research. Pr.: Consent of instructor.

For more information

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Plant Pathology

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S. H. Hulbert, Ph.D., University of California, Davis.
D. J. Jardine, Ph.D., Michigan State University.
L. B. Johnson, Ph.D., Purdue University.
J. E. Leach, Ph.D., University of Wisconsin–Madison.
J. F. Leslie, Ph.D., University of Wisconsin–Madison.
H. Leung, Ph.D., University of Wisconsin–Madison (Adjunct).
F. W. Schwenk, Ph.D., University of California, Berkeley.
D. L. Seifers, Ph.D., Mississippi State University
D. L. Stuteville, Ph.D., University of Wisconsin–Madison.
X. Y. Tang, Ph.D., Purdue University.
N. A. Tisserat, Ph.D., University of Wisconsin–Madison.
T. C. Todd, M.S., Oklahoma State University.
H. N. Trick, Ph.D., Florida State University.
F. F. White, Ph.D., University of Washington–Seattle.
J.-M. Zhou, Ph.D., Purdue University.

Programs

Plant pathology is the study of plant diseases, their cause, effects, and control. The discipline is closely integrated with the other biological sciences, with unique strengths in basic and applied research. We have personnel working on the major crops in Kansas (wheat, sorghum, alfalfa, corn, soybeans), on horticultural plants, on each of the major pathogen groups (fungi, including beneficial fungi; bacteria; viruses; and nematodes), in specialty areas such as disease physiology, epidemiology, stored grain pathology, disease diagnosis, and genetics of host-parasite interactions, and in the newer areas of biotechnology, including molecular genetics and cell and tissue culture. Molecular genetics is a departmental strength. We also cooperate on interdepartmental research projects; the interdisciplinary Wheat Genetics Resource Center and the KSU Plant Biotechnology Center are administered through this Department.

The department has an exceptionally strong invited seminar series, with an average of 18 outside speakers per year from universities, research centers, and private industries from around the world. Plant pathology currently has 23 faculty members. We have 30 to 35 graduate students, about 15 postdoctoral fellows and visiting scientists, and about 15 technical research assistants.

The Department of Plant pathology shares Throckmorton Plant Sciences Center with the other plant science departments. It was completed in 1994 and has 161,000 square feet of laboratory, classroom, and office space. Laboratory space is modern and well-equipped, and interaction with other departments is strong. The plant science departments share 100,000 square feet of new greenhouse space attached to Throckmorton Plant Sciences Center.

Degree options and requirements

The department offers a full range of courses leading to the M.S. and Ph.D. degrees. These cover diseases caused by bacteria, fungi, nematodes, and viruses; bacterial and fungal genetics; disease control, diagnosis, ecology, epidemiology, and physiology; host plant resistance to disease; plant pathology methods; plant tissue culture and regeneration; plant cytogenetics; and student seminar, special problems and topics, and research.

Incoming graduate students are expected to have background course work in the biological sciences (botany or biology, plant pathology, entomology, mycology, microbiology, genetics); chemistry (inorganic, organic, biochemistry); mathematics; physics; statistics; and soil science or geology. Some course work to remedy background deficiencies can be taken along with graduate courses. Grades in relevant courses should be A or B, with an overall grade point average of at least B. We do not require a GRE score. Students working toward an M.S. degree are required to take any two of the following: Plant Nematology, Plant Virology, Plant Pathogenic Bacteria, and Plant Pathogenic Fungi. They are also required to take either Ecology and Epidemiology of Plant Pathogens or Molecular Plant-Microbe Interactions. Seminar in Plant Pathology is to be taken once for credit, in addition to the thesis defense seminar. Research (or Report) and electives selected in conference with their committee constitute the remainder of the program. Students working toward Ph.D. degree are required to take all of the following: Plant Nematology, Plant Virology, Plant Pathogenic Bacteria, Plant Pathogenic Fungi, Ecology and Epidemiology of Plant Pathogens, and Molecular Plant-Microbe Interactions. Seminar in Plant Pathology is to be taken three times for credit, in addition to the thesis defense seminar. Research and electives selected in conference with their committee constitute the remainder of the program.

Once each year, each graduate student who has completed at least one semester at K-State will be asked to summarize the progress they are making toward their degree. This formal report will include research objectives, tentative thesis title, a timetable of meeting Graduate School requirements, and a summary of progress.

Admission

Applications are accepted at any time of the year, and graduate studies can begin during fall, spring, or summer terms. Applying early increases the probability of being awarded an assistantship. Application blanks can be obtained from the department and from the Graduate School. All application materials should be sent to the department.

Financial assistance

Financial support may be available to qualified students, with priority to U.S. students. Departmental graduate research assistantships for 1999-2000 are $15,800 for students working toward an M.S. degree and $17,000 for students working toward a Ph.D. degree; assistantships increase about $400 per year. Out-of-state (but not in-state) tuition is waived with either of these appointments. All applications are evaluated for available assistantships. Students may also be eligible to apply for fellowships from private and federal sources.

Departmental assistantships are limited to 30 months for M.S. from B.S., 48 months for Ph.D. from M.S., and 54 months for Ph.D. from B.S. degree. Duration of assistantship from grants and other sources is determined by the faculty member in charge. Continuation of all assistantships depends upon continued satisfactory progress toward the degree and availability of funding.

All students on half-time assistantships are required to enroll in at least 10 credit hours during each regular semester and 3 credit hours during the summer. Research hours can be taken as needed to fill in these credits. This requirement will be waived during the semester in which the degree is granted, although students must be enrolled during that semester.

Although there are no formal GTAs in plant pathology, all graduate students assist in teaching at least one course in the department during their graduate studies. In consultation with the student's advisor and the faculty member responsible for the course, the student can sign up for 1–2 credits of either PLPTH 750 (Problems in Plant Pathology; for assisting in courses numbered 699 and below) or PLPTH 920 (Topics in Plant Pathology; for assisting in courses numbered 700 and above).

Students on departmental assistantships are expected to serve as teaching assistants in departmental undergraduate courses (currently PLPTH 300, 500, 505, 607, and 613) as needed, but not more than once each year.

Students whose native language is not English are required to first score at the appropriate level on an English comprehension test administered by the English Language Program at K-State. Cost of this test is borne by the department.

Plant pathology courses

PLPTH 500. Principles of Plant Pathology. (3) II. An introductory class in the nature of plant pathogens and the cause, effect, and control of plant diseases. Diseases of field and horticultural crops will be addressed. Two hrs. lec., one 2-hr. lab a week. Not open to students with credit for PLPTH 510 or PLPTH 520. Pr.: BIO 198, 210, or equiv., and junior standing.

PLPTH 505. Biotechnology. (2) II. The use of biotechnology and molecular genetic approaches in plant and animal sciences. Emphasis is on the use of milecular techniques for plant and animal improvement. Two hr. lecture per week. Pr.: BIOL 198. Cross-listed as AGRON 505 and ASI 505.

PLPTH 585. Crop Diseases. (2) I. An overview of plant diseases associated with Kansas crops, with an amphasis on identification and management strategies. Two hr. lecture and four hr. lab a week. To meet first half of the semester. Pr.: PLPTH 500.

PLPTH 590. Landscape and Turf Diseases. (2) II. An overview of plant diseases associated with Kansas landscape and turf settings, with an emphasis on identification and management strategies. Two hr. lecture and four hr. lab a week. To meet second half of semester. Pr.: PLPTH 500.

PLPTH 599. Undergraduate Research in Plant Pathology. (1–3) I, II, S. Research experience is offered in classical and molecular plant pathology and biotechnology. Pr.: Background of training needed for the research problem undertaken.

PLPTH 730. Plant Nematology. (3) II, in even-numbered years. An introduction to the morphology, taxonomy, and ecology of phytoparasitic and free-living nematodes found in plants, soil, and fresh water. Emphasis is on the identification and control of plant parasitic nematodes and on lab techniques used in their study. Two hrs. lec., one 2-hr lab a week. Pr.: PLPTH 500.

PLPTH 750. Problems in Plant Pathology. (1–3) I, II, S. Work is offered in general plant pathology, plant virology, plant nematology, disease physiology, epidemiology, and disease diagnosis. Pr.: background of courses needed for the problem undertaken.

PLPTH 760. Plant Pathology Methods. (3) I, in even-numbered years. Practical laboratory methods in manipulating plant pathogens with emphasis on the isolation, culture, identification, inoculation, and preservation of plant pathogenic bacteria and fungi. One hr. lecture and 5 hrs. lab a week. Pr.: PLPTH 500 or equivalent. Enrollment limited to 12 students.

PLPTH 835. Plant Virology. (3) I, in odd years. A study of the composition, symptomatology, diagnosis, isolation, replications, molecular biology, genetics, and evolution of plant-infecting viruses. The laboratory will consist of instruction in general reserach techniques and equipment usage, including viral inoculation, symptomatology and serology, with emphais on molecular techniques used in plant virology. Two hours lec., one four-hour lab a week. Pr.: ASI 500, BIOCH 521, BIOCH 522, and PLPTH 500.

PLPTH 840. Plant Pathogenic Bacteria. (3) S, in even-numbered years. Emphasizes the etiology, epidemiology, dissemination and survival, taxonomy, mechanisms of pathogenicity, serology, host-parasite relations, control measures, and the principles and methods of identifying plant pathogenic bacteria. Laboratory sessions will be devoted to usage of general laboratory equipment and research techniques. Nine hours combined lec./lab a week. Pr.: BIOCH 521, PLPTH 500.

PLPTH 845. Plant Pathogenic Fungi. (3) I, in even-numbered years. The isolation, handling, storage, inoculation, terminology and taxonomy of fungal pathogens of plants. Particular attention will be given to techniques used to study fungi and to the genus and species concepts for important plant pathogenic fungal genera. Two hours lec., one three-hour lab a week. Pr.: PLPTH 500 and BIOL 604.

PLPTH 860. Host Plant Resistance to Disease. (2) II, in odd-numbered years. A consideration of basic and applied aspects of controlling plant disease through host plant resistance. The relationships of disease components are elucidated, and types and characteristics of plant disease resistance are considered. Methods of using disease resistance in crop production are developed. Two hrs. lecture discussion a week. Pr.: PLPTH 500 and ASI 500.

PLPTH 870. Seminar in Plant Pathology. (1) I, II. Reports in the field of plant pathology. Pr.: consent of instructor.

PLPTH 898. Master's Report. (2) I, II, S. Pr.: background of courses needed for the topic undertaken. PLPTH 899. Research in Plant Pathology for the M.S. degree. (Var.) I, II, S. Work is offered in each of the major pathogen groups, genetics of plant-microbe interactions, disease physiology, ecology, and epidemiology. Pr.: sufficient background to conduct the line of research undertaken.

PLPTH 905. Ecology and Epidemiology of Plant Pathogens. (3) I, in even-numbered years. Ecological relationships of soilborne and foliar pathogens, as well as the biological and environmental factors which influence the spread of plant diseases. Pr.: PLPTH 500 and one of the following: PLPTH 835, PLPTH 840, PLPTH 845, or BIOL 604.

PLPTH 910. Molecular Plant-Microbe Interactions. (3) I, in odd-numbered years. Discussions of molecular and genetic perspectives of resistant and susceptible interactions between plants and bacterial, viral and fungal pathogens. Evaluation of current hypotheses on the nature of disease resistance. Pr.: PLPTH 500, BIOCH 521, and BIOL 500; BIOL 540 or ASI 500; and one of BIOL 800, PLPTH 835, PLPTH 840, or PLPTH 845.

PLPTH 911. Plant Tissue Culture and Regeneration. (3) II, in odd-numbered years. Plant tissue culture principles, techniques, and applications, with emphasis on plant regeneration from protoplasts and the use and potential of this procedure for crop improvement through genetic engineering. Research-level skills in this area will be taught. Two hrs. lecture and 3 hrs. lab a week. Pr.: ASI 500, BIOL 500, and one of BIOCH 521, 525, or 755. Enrollment limited to 18 students.

PLPTH 912. Molecular Approachcs in Plant Pathology. (4) I, in even-numbered years. The use of molecular techniques in research in the plant sciences, with an emphasis on plant pathology. Techniques will include DNA cloning, DNA sequencing, polymerase chain reaction, and plant transformation. Eight hrs. lecture lab a week. Pr.: BIOCH 521 and BIOL 675.

PLPTH 915. Advanced Techniques in Cytogenetics. (3) I, in odd-numbered years. An advanced course in research techniques in genome analysis, especially of higher plants emphasizing genetic mapping by use of various cytogenetic stocks. Laboratory and greenhouse experiments are performed. Pr.: AGRON 770 or BIOL 615 or equivalent.

PLPTH 920. Topics in Plant Pathology. (Var.) I, II, S. Discussions and lectures on important areas and contributions in the field of plant pathology. Pr.: Graduate standing.

PLPTH 927. Fungal Genetics. (3) II, in even-numbered years. A study of the classical, molecular, and population aspects of fungal genetics in both model and commercially important systems. Topics to be discussed include genetic analysis via mitosis and meiosis, models of recombination, genetic control of fungal development, basic molecular genetics of fungi, and genetic factors affecting fungal population structure and stability. Three hrs. lecture discussion a week. Pr.: BIOCH 521, ASI 500; recommended: BIOL 640 and a 600-level or higher course in genetics.

PLPTH 930. Genome Analysis. (3) II, in odd-numbered years. A discussion of the organization and evolution of genetic material in eukaryotic organisms. Methods of genetic and molecular analysis will also be discussed. Three hrs. lecture a week. Pr.: ASI 500; BIOL 540 or BIOCH 765.

PLPTH 999. Research in Plant Pathology for the Ph.D. degree. (Var) I, II, S. Work is offered in each of the major pathogen groups, genetics of plant-microbe interactions, disease physiology, ecology, and epidemiology. Pr.: sufficient background to conduct the line of research undertaken.

For more information

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Political Science

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Linda K. Richter, Ph.D., University of Kansas.
Michael W. Suleiman, Ph.D., University of Wisconsin.
Scott Tollefson, Ph.D. Johns Hopkins University.
Krishna K. Tummala, Ph.D., University of Missouri, Columbia.
Joseph K. Unekis, Ph.D., Indiana University.

Master of arts (30 hours)

The master of arts program meets the educational and professional needs of three groups of students: (1) those planning to become high school teachers or instructors in two-year colleges; (2) working professionals and other adults desiring to improve their qualifications or seeking a greater understanding of political life; and (3) students wishing to prepare for Ph.D. or other advanced study. The degree requirements are structured, therefore, to provide students with an education which prepares them for a mature grasp of politics, a respect for intellectual integrity, and an ability to communicate effectively. Graduate work in political science is offered in American government and politics, comparative government and politics, international relations, and political thought. Graduate work in political

science is offered in American government and politics, comparative government and politics, international relations, and political thought. All candidates for the master of arts degree are required to take the following:

Required courses

POLSC 700	Research Methods in Political Science	3
POLSC 805	Seminar: American Government Problems	3
POLSC 821	Seminar: Political Thought	3
POLSC 811	Seminar: International Politics	3
POLSC 841	Seminar: Comparative Politics	3

No more than three hours of "non-class" seminars or courses (e.g., readings, problems, internships) are allowed to count toward the 30 hours required for the M.A.

Written comprehensive examinations.

An oral defense of the thesis (Option A), report (Option B), or seminar papers (Option C). Please note: Master's students should earn 60% or more of their credit hours in courses numbered 700 or higher.

Students may choose, in consultation with their advisers, one of three programs leading to the master of arts degree:

Option A
This option requires 30 hours of graduate credit, including 6 hours of credit for a thesis. Of the remaining 24 hours, at least 18 must be in political science.

Option B
This option requires 30 hours of graduate credit, including 2 hours of credit for a written research report. Of the remaining 28 hours, at least 19 must be in political science.

Option C
This option requires 30 hours of graduate credit in political science, of which at least four courses should be 800-level seminars taken from at least three different professors. In addition, students in this option should write four research seminar papers acceptable to the professors involved.

Comprehensive examination

All master of arts degree aspirants must successfully complete a comprehensive examination, normally between the end of the course work and execution of the master's thesis or report. Students shall receive evaluation of their performance approximately two weeks after the examination. Passing performance requires three-quarters majority of the committee. The committee will give as an overall grade one of the following: pass with honors; pass; fail.

If a candidate fails a master's examination, he or she may be allowed to take a second examination, which cannot take place fewer than two months or more than 15 months after the failed examination unless an extension is granted by the Dean of the Graduate School. No third examination will be allowed.

Oral defense of thesis/report

The student's oral defense of the thesis/report is composed of two parts:

1. Defense of the thesis/report.

2. Questions of a general nature pertaining to the field of political science.

Prior to the defense, students must obtain approval forms from the Graduate School, and have them signed by the members of the examining committee. The Graduate School will then prepare notices and a ballot for each examination.

The oral examination is taken when the student's committee certifies that a satisfactory copy of the report/thesis/seminar papers has been presented. Passing performance requires three-quarters majority of the committee.

Students taking the nonthesis, nonreport option must complete their internships, reports, and related course requirements before they are eligible to receive their degrees.

Students must be enrolled for a minimum of 1 credit hour the semester they expect to receive their degrees.

Prior to the end of the second semester of graduate work, each student should meet with the graduate advisor to identify a major professor and supervisory committee. This committee (including the major professor) shall be composed of at least three members. One committee member may be from outside the political science department.

Each student should file a program of study prior to the end of the candidate's second semester. The program of study form must be obtained at the Graduate School office in Fairchild Hall or from the department office in Waters Hall. After consultation with the supervisory committee, the student should type on the form the list of courses completed and/or to be completed. The form must be signed by all committee members and the department head. The form may then be photocopied and forwarded to the Graduate School.

The Graduate School has issued the following important statement concerning student responsibility:

Graduate students are held responsible for knowing the academic policies and degree requirements set forth in the *Graduate Catalog*. They are likewise held responsible for knowing the regulations concerning the degree they plan to take and any special requirements within the department or academic unit. In addition, it is the student's responsibility to be informed regarding the university's policies as to the standard of work required for continued enrollment in the Graduate School. The Graduate School should be consulted if additional information is needed.

Master of arts with a certificate in international service (42 hours)

The purpose of the M.A. degree in political science with a certificate in international service is to prepare students for a career in a variety of areas including: diplomacy, intelligence, international business, international agriculture, the military, non-governmental organizations, the United Nations, and many others.

The certificate program is part of the M.A. program, and the basic requirements of the M.A. program must be met in order to obtain the degree and the certificate. The certificate cannot be earned without the degree.

Requirements for certificate option

All candidates for the certificate in international service with an M.A. in political science must fulfill the following requirements:

Language examination: No credit will be given for language courses, but the student must pass an exam based on the Department of State's language examinations. Choice of language will depend on the student's area of specialization and will be chosen in consultation with his/her advisor. Except in the most exceptional cases, language examinations will be administered by the Department of Modern Languages.

In addition to the five core classes listed above under the MA program, all students must take the following political science courses:

POLSC 647	International Law
POLSC 651	International Organizations
POLSC 754	The Professional Diplomat and Foreign Policy Formulation
Total units	24 (including 15 core hours)

Other required courses
One graduate course in history from a pre-approved list and either

ECON 681	International Trade
	or
POLSC 756	International Political Economy
Total Units	6

The remaining 12 hours will consist of specialized courses which must be at the 600 level or higher, have an international focus and must be on a par with those required for the political science MA. A three credit internship in the student's area of specialization may be substituted for one of these courses.

Written requirement

Candidates must meet a written requirement. The written requirement can be satisfied in one of the following ways:

1. The candidate may take the four seminar term paper option.

2. The candidate may take the three hour internship option under the specialized course requirement. The internship will include a written report. The written portion of the internship would be the equivalent of the two hour report offered in the traditional MA program.

3. The candidate may take under the specialized course requirement, a three hour report instead of the internship.

4. The candidate may take under the specialized course requirement the traditional six hour thesis option. With this option the candidate would be allowed to combine the three hour reading option with the three hour report option to provide the six hours required for

the thesis. If this option is taken, the 12 hour specialized course requirement would consist of six hours of traditional course work and six hours of thesis.

Comprehensive examination MA with international service emphasis
All master of arts degree aspirants selecting the international service emphasis must successfully complete comprehensive written and oral examinations, normally in the last semester of study. Students shall receive evaluation of their performance on the written examination approximately two weeks after the examination. Notification of performance on the oral exam will typically take less time. Passing performance on both the written and oral components of the comprehensive require three-quarters majority of the student's committee. The committee will give as an overall grade one of the following: pass with honors; pass; fail. If a candidate fails either component of a master's examination, he or she may be allowed to take that component a second time. This cannot take place fewer than two months or more than fifteen months after the failed examination unless an extension is granted by the dean of the Graduate School. No third examination will be allowed.

Requirements for and evaluation of the oral exam
Prior to the oral exam, students must obtain approval forms from the Graduate School, and have them signed by the members of the examining committee. The Graduate School will then prepare notices and a ballot for each examination.

The oral examination is taken when the student's committee certifies that the student has successfully completed the written comprehensive examination. As with the written exam, passing performance on the oral exam requires three-quarters majority of the committee.

Students are reminded that they must complete their internships, reports, and related course requirements before they are eligible to receive their degrees. Also, students must be enrolled for a minimum of one credit hour the semester they expect to receive their degrees.

Master of public administration (42 hours)

The master of public administration degree is designed as a professional degree for those who wish to hold administrative positions in the public sector. This degree prepares individuals for administrative careers in a wide range of environments by offering a program of study which is comprehensive, flexible, and interdisciplinary.

The program is committed to meeting the needs of both pre-service and in-service students. Pre-service students without administrative experience have enjoyed success in obtaining both valuable internships while pursuing their degree and challenging positions upon graduation. In-service students have found this program especially attractive since, through careful scheduling, courses required for the degree may be completed in the evenings.

Degree requirements
The degree requires 42 hours of graduate credit including core public administration courses, an area of specialization, electives, and, for pre-service students, an internship. Full-time students are normally able to complete the degree in two years. The core courses are designed to familiarize all students with fundamental aspects of public administration. The six courses in this category are Research Methods, Public Personnel Administration, Policy Analysis and Evaluation, Public Organization Theory, Public Budgeting, and Seminar in Public Administration.

Each student is also required to develop an interdisciplinary area of specialization, such as budgeting and finance, personnel administration, and planning. However, other areas of interest specific to individual students are met on a case-by-case basis under special circumstances with the advice of the director of the program.

Students also take three political science electives, one of which must be a seminar. This component of the curriculum helps students to gain a better appreciation of the political environment in which public administrators operate. Students may choose from an extensive range of graduate courses and advanced seminars regularly offered by the Department of Political Science.

Pre-service students are required to complete an internship, involving a minimum of ten weeks of full-time employment in an administrative capacity. This may involve appointments with public and not-for-profit sector employers. Students in this degree program have been unusually successful in previous competitions for prestigious internships such as the Kansas Governor's Fellows Program and the U.S. Presidential Management Internship Program.

Career
The degree prepares students for employment in a variety of public sector administrative positions with state, federal, and local governments; not-for-profit corporations; public interest groups; international agencies; and private corporations that provide public services under government contract or franchise. Recent graduates of this program include those employed by the U.S. Office of Personnel Management; U.S. Department of Justice; the Kansas Departments of Commerce, Administration, and Transportation; the Legislative Auditor; and several Kansas communities.

Admissions

To be eligible for admission, a student must have a bachelor's degree with a minimum of 3.0 GPA (on a four point scale). Others with at least a 2.7 GPA may be admitted on probation, or on special student category. Application materials for admission to either the M.A. program or the MPA program must be returned to the department and should include a completed application form, two official transcripts from all colleges previously attended, three letters of recommendation (on official letterhead), and a statement of the candidate's personal objectives. Graduate Record Exams (GRE) are also recommended for all students applying to the political science program and are required for all students applying to be graduate teaching assistants. Foreign students, in addition to the above materials, need to submit a TOEFL score (a minimum of 550) and a financial support form and pay a $25 processing fee.

Admission to the MPA and MA programs and financial assistance are based on academic accomplishment and promise. Admission applications are welcome at any time.

Financial assistance
The Department of Political Science provides financial aid for assistance with teaching, or research, or both. Specific assignments to teaching or research depend on the needs and abilities of the graduate assistant, and the needs of the department.

Selection criteria
Awards reflect the following criteria:

a. Academic performance, promise, and intellectual ability.

b. Past performance as a departmental assistant, if applicable.

c. Teaching and research needs of the department faculty.

d. Financial need.

e. Minimum 6 hour enrollment during term of assistance, under ordinary circumstances.

f. Reasonable progress toward master's degree.

Amount of assistance
Graduate assistantships are measured in "tenths" time, ranging from one-tenth to four-tenths, each tenth corresponding to a dollar amount which changes annually with university and department appropriations. In addition, graduate assistants are eligible for waivers and reductions of tuition fees, depending on legal residence and amount of assistance.

Duties
Each tenth of assistance corresponds to an average of four hours of work each week, or 16 hours of work for a full four-tenths assistantship. Faculty supervisors are responsible for arranging an equitable correspondence of

tenths' assistance and duties, and each graduate assistant is responsible for keeping his or her principal faculty supervisor informed on how this obligation is met.

Supervision
Each assistant is assigned to one or two faculty members, depending on the department's needs and the student's preference. Graduate assistants may be asked to help any member of the department faculty, subject to clearance with the student's principal advisors.

Conditions of assistance
All teaching assistants are expected to maintain a 3.0 GPA during the period of appointment with the department, and to perform their duties satisfactorily. The department reserves the right to withdraw support if academic performance falls below the 3.0 GPA or if the job performance is not satisfactory.

Application procedure
Applicants should submit the following to the head of the Department of Political Science not later than November 1 for the spring term, or April 1 for the fall term or for the nine-month academic year:

1. One copy of an application form available from the department secretary.

2. A formal covering letter of application. This letter may also be used to expand on items in the application form, and to document financial need.

All applicants will be notified of the department's decisions, and award recipients will be asked formally to acknowledge acceptance.

Selection committee
The department's admissions and assistance committee consists of three faculty members.

Announcement dates
Awards are announced on or about April 15, and November 15. Ordinarily, there are no summer term graduate assistantships.

Political science courses

Graduate courses

American government and politics

POLSC 501. Political Behavior. (3) An examination and explanation of the basic terms and distinctions necessary for the study of politics, government, and political behavior emphasizing the dimensions of political behavior, including politicization, identification, ideology, participation, socialization, class, structure, and situations. Pr.: POLSC 110 or 325, or sophomore standing.

POLSC 502. Television and Public Policy. (3) I. Television as a political institution, emphasizing TV structure, contents, uses, and gratifications in political thought and public policy; comparative analysis of television with other mass media and non-media influences on political behavior. Pr.: POLSC 110 or 325, and sophomore standing, or appropriate vocational experience with consent of instructor.

POLSC 507. Introduction to Public Administration. (3) I. The basic concepts of public administration, with emphasis on orientation for citizen understanding; the place of administration and the role of the administrator in the American political process; the organization and activities of government in carrying out public policy; administrative functions, organization, accountability, finance, and personnel. Pr.: POLSC 110 or 325 or ECON 110.

POLSC 508. The Mass Media and Political Campaigns. (3) I. Roles of the mass media in the electoral process. Dynamics of voter decision making and the impact of the media on voter attitudes and choices. Pr.: POLSC 325.

POLSC 519. National Security Policy and Process. (3) I. Formation and management of contemporary U.S. security establishment and policies with emphasis on arms control, competition for resources, civilian-military relations, and interaction among Congress, the president, and the bureaucracy. Pr.: POLSC 325.

POLSC 603. Political Parties and Elections. (3) I. Origins, structure and function of political parties. Dynamics of the two-party system. Roles of third parties. Analysis of election results and voting behavior. Pr.: POLSC 110, 325 or junior standing.

POLSC 604. Interest Groups and Public Opinion. (3) II. Group theory and politics. Structure, internal politics, and techniques of interest groups and their impact on public policy. Formation and measurement of public opinion. Pr.: POLSC 110 or 325.

POLSC 605. The American Presidency. (3) The presidency as an institution, its evolution, congressional relationships, executive organization. Pr.: POLSC 110, 325 or junior standing.

POLSC 606. Gender and Politics. (3) II. Analysis of the role of gender in political behavior, including gender differences in voting and political participation, legal and cultural restrictions on women's rights and political activity, and women's liberation and other gender-based political movements. Pr.: SOCIO 545 or POLSC 325.

POLSC 607. Administrative Law. (3) II. Legal analysis of the rule-making, adjudicatory, and enforcement functions of administrative agencies, with emphasis on constitutional framework, judicial review, requirements of procedural fairness, and rights of public employees. Pr.: One course in political science, U.S. history, or legal or political philosophy.

POLSC 611. The Legislative Process. (3) II. Legislative decision-making in modern democracy with emphasis on the United States, the concept of representation, and political behavior of participants in the legislative process. Pr.: POLSC 110, 325, or junior standing.

POLSC 612. The Judicial Process. (I) in alternate even years. The structure, process and politics of the American judicial system. Analysis of important issues concerning law and courts. Pr.: POLSC 325

POLSC 614. Constitutional Law I. (3) I. Principles of the American political system as prescribed by the Constitution and interpreted by Supreme Court decisions, with emphasis on the institutions and powers of the national government federalism, and property rights. Pr.: One course in political science, U.S. history, or legal or political philosophy.

POLSC 615. Constitutional Law II. (3) II. The Constitution as a limitation on governmental power, with emphasis on Supreme Court decisions defining fundamental civil rights and liberties. Pr.: One course in political science, U.S. history, or legal or political philosophy.

POLSC 618. Urban Politics. (3) I. Fundamental problems of political power and decision making in urban suburban governmental settings. Pr.: POLSC 110 or 325.

POLSC 620. State and Local Government. (3) II. The U.S. system of federalism with emphasis on a comparative analysis of the government and politics of the fifty states and their subdivisions. Pr.: POLSC 110 or 325.

POLSC 708. Public Personnel Administration. (3) I. Personnel aspects of administration at all levels of government, including recruitment, selection, discrimination law, pay, and motivation. Emphasis on to those features unique to the public sector, e.g. civil service systems, public unions, and public sector ethics law. Pr.: POLSC 507 or 607.

POLSC 710. Policy Analysis and Evaluation. (3) II. Methods of policy analysis and evaluation. Includes a discussion of the relationship between public policy and the distribution of values in society. Students analyze policies in an area of their choice; e.g., agriculture, business, health, income, trade. POLSC 325 or 507.

POLSC 735. Public Organizational Theory. (3) I. Theories of the structure and mission of public organizations. Explores the use of analytical questioning of various theories, to solve organizational problems. Pr.: POLSC 325 or 507.

POLSC 737. Public Budgeting. (3) I. Budgeting as apart of our political system and as a fiscal process assists in allocating scarce resources. Overview of the budgetary decision-making process and the various budgetary approaches. Pr.: POLSC 507 or MANGT 420.

Comparative government and politics

POLSC 504. Political Sociology. (3) II, in even years. An introduction to the principles of political sociology. Processes of political socialization, participation within and outside established organizational channels, recruitment of elites, communication and influence, power, decision making, and policy outputs. Data are presented from a cross-national perspective. Pr.: SOCIO 211; POLSC 110. Same as SOCIO 504.

POLSC 505. Introduction to the Civilization of South Asia I. (3) I. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, dominant philosophical and social concepts, social and political institutions, literature and historical movements. Pr.: Same as HIST 505, ECON 505, SOCIO 505, ANTH 505.

POLSC 506. Introduction to the Civilization of South Asia II. (3) II. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages and literature, geography, social and political structures and ideas. Pr.: Same as ECON 506, HIST 506, SOCIO 506, ANTH 506.

POLSC 511. Contemporary Chinese Politics. (3) Principal components of Communist Chinese ideology, conditions determining organizational structure, composition of present leadership, role of social forces, impact of external relations on other Asian nations and on the major world powers.

POLSC 545. The Politics of Developing Nations. (3) II. Comparative analysis of politics in emergent states with emphasis on process of modernization and nation building. Pr.: POLSC 110 or 344 or sophomore standing.

POLSC 619. Comparative Agriculture Politics and Policy. (3) I. Comparative examination of agricultural politics and policy with emphasis on decision making processes and the socio-political impacts of agricultural policy. Pr.: POLSC 110 or 344.

POLSC 621. West European Politics. (3) I. Comparative analysis of British, French, German, and Italian democracies, political systems. Pr.: POLSC 344.

POLSC 622. Latin American Politics. (3) I. Comparative analysis of selected political systems of Latin America emphasizing political inputs, political organization, and political outputs. special consideration is given to problems of political change. Pr.: POLSC 110 or 344 or junior standing.

POLSC 623. South Asian Politics. (3) II. Analysis of selected political systems of South Asia. Pr.: POLSC 344, 505, or 506.

POLSC 624. Middle East Politics. (3) II. Comparative analysis of selected political systems in the Middle East including nationalism and the conflict of differing ideologies. Validity and usefulness of various theories of political development are tested. Pr.: POLSC 110, 344, or junior standing.

POLSC 626. African Politics. (3) Comparative analysis of selected political systems of sub-Sahara Africa, including consideration of problems of nationalism and political development. Pr.: POLSC 110, 344, or junior standing.

POLSC 627. Eastern and Central European Politics. (3) II. Examination of comparative politics and policy in the countries of Easter and Central Europe. Pr.: POLSC 344.

POLSC 629. Development Policy and Administration. (3) I. Comparative examination of development policy, politics, and administration. Pr.: POLSC 110, POLSC 344, POLSC 377, or POLSC 507.

POLSC 630. Politics of Russia and the Former Soviet Union. An overview of the major factors influenicing the evolution of politics in Russia and the Soviet Union. Special emphasis is placed on the problems associated with the transition from a communist to a non-communist more democratic policy. Pr.: POLSC 344.

POLSC 631. Comparative Civil-Military Relations. (3) I. A look at civil-military relations in the U.S., Russia, Germany, Spain and a number of other countries. Primary focus will be on understanding the political role of the military in totalitarian, authoritarian and democratic states. Pr.: POLSC 344.

POLSC 707. Comparative Administrative Systems. (3) I. Comparative analysis of public administration concepts and the morphology of administrative systems. Included are U.S., British, and French models and attempts by Third World countries to adapt these to their local cultures. Pr.: POLSC 344 or 507.

International relations

POLSC 541. International Relations. (3) II. Analysis of the nature of international relations with emphasis on contemporary theories explaining the international behavior of states. Pr.: POLSC 333.

POLSC 543. American Foreign Policy. (3) II. Examination of American external relations since 1945 and evaluation of processes involved in the formulation and conduct of contemporary foreign policy of the United States. Pr.: POLSC 325 or 333.

POLSC 642. International Conflict. (3) II. The nature of political conflicts in the world and the "types" of such conflicts. Emphasis is on determining the "causes" of the various conflict types as well as providing the student with a better understanding of the conflict process from political dispute through the escalation stages to war. Pr.: POLSC 333 and junior standing.

POLSC 645. International Politics of Europe. (3) II. Relationships among the countries of Europe since World War II. With emphasis on efforts to create a more unified European Community. Among the organizations that will be studied are the former Warsaw Pact, NATO, the European Parliament, and the European Union. Pr.: POLSC 333.

POLSC 647. International Law. (3) Theories of international law, and general problems, such as: recognition, responsibility, war crimes, sources, evidence, codification, and settlement of disputes. Pr.: POLSC 333, 541, or junior standing.

POLSC 649. International Defense Strategies. (3) I. Contemporary international strategies and defense policies with emphasis on nuclear, conventional, and guerrilla war, arms control and disarmament, diplomatic and political roles of the military. Pr.: POLSC 333, 541, or junior standing.

POLSC 651. International Organization. (3) Structure, functions, values, and effectiveness of international organizations with emphasis on the United Nations, European Union, and other regional arrangements. Pr.: POLSC 333, 541, or junior standing.

POLSC 652. International Politics of South Asia. (3) I. Study of regional problems of South Asia and of international roles and foreign policies of South Asian states. Pr.: POLSC 344 or 623.

POLSC 653. International Politics of the Middle East. (3) I. Consideration of the Arab-Israeli conflict, inter-Arab relations, foreign policies of Middle Eastern states, and the impact of the major foreign powers on the area. Pr.: POLSC 333, 344, or three hours of other social sciences.

POLSC 654. International Politics of Africa. (3) The course analyzes contemporary relations among African countries including economic and political security, border claims, formal and informal economic relations, and regional groupings. The course also examines the relations between African countries, the United States and the former Soviet Union, and between African countries and the former colonial rulers. Pr.: POLSC 334, 344, or junior standing.

POLSC 754. The Professional Diplomat and Foreign Policy Formulation. (3) I. Present day foreign policy formulation in the United States government, including the role of professional diplomats and foreign affairs specialists in the State Department and embassies abroad, as well as within other U.S. Government agencies. Pr.: POLSC 333.

POLSC 756. International Political Economy. (3) The course introduces students to the political and historical dimensions of the international economy, dimensions that include trade, monetary systems, foreign investment, aid, dependency, and global interdependence. This course also examines various theories and practices of the international system, the state, bureaucracies, interest groups, international organizations, bargaining processes, and distributive norms. Pr.: ECON 110 and 120, POLSC 333, 344, and 541, or junior standing.

Political thought

POLSC 661. Political Thought: Classical to Sixteenth Century. (3) I. Systematic study of ideas about law, politics, and government of great philosophers of Western civilization from Greek antiquity to the sixteenth century. Pr.: POLSC 110, 301, or junior standing.

POLSC 663. Political Thought: Since the Sixteenth Century. (3) I. Study of the development of Western political thought from the sixteenth century to the twentieth century. Pr.: POLSC 110, 301, or 325.

POLSC 667. American Political Thought. (3) I. Political ideas underlying the American union, including the doctrine of rights, the nature of union, liberty, property, and democracy. Pr.: POLSC 110, 301, 325 or three hours in other social sciences.

POLSC 671. Modern Political Thought. (3) Study of contemporary political ideas and social thought. Pr.: POLSC 110, 301, or junior standing.

POLSC 675. Religion and Politics. (3) II. Focuses on religious life in America and its changing relationship to politics and government. Examination of the American founding as it relates to church/state issues, the controversy over meaning of the First Amendment's establishment and free exercise clauses, and contemporary political agendas of mainline and evangelical churches. Pr.: POLSC 110, 301, 325, or 3 hours in other social sciences.

POLSC 711. Administrative Ethics. (3) I. Ethical issues, approaches, and strategies in public service. Pr.: POLSC 325 or 507 or graduate standing, or consent of the instructor.

Methods, seminars, readings, and problems

POLSC 555. Senior Honors Seminar. (3) Open to senior majors who have attained a 3.0 grade point average in political science.

POLSC 700. Research Methods in Political Science. (3) I. Principles of research design, of measurement of political phenomena, and of methods for collecting and analyzing political data. Pr.: POLSC 325, 333, or 344.

POLSC 701. Computer and Quantitative Analysis in Political Science. (3) II. Advanced data management, data analysis, and computing skills involved in conducting political science and public policy research. Pr.: POLSC 400 or 700.

POLSC 784. Internship in Government, Public Administration, and Politics. (1–3, Credit/No Credit only) I, II, S. Supervised field work at the international, national, state, and local levels of government or with political parties or other politically oriented voluntary organizations. May be repeated once. Pr.: Consent of instructor and a minimum of two courses in political science, at least one of which must be relevant to the internship area.

POLSC 785. Readings in Political Science. (3) I, II. Directed reading and discussion of a selected topic in political science.

POLSC 790. Problems in Political Science. (3) I, II. Students will complete a research project and prepare an original paper under the supervision of a faculty member.

POLSC 791. Topics in Political Science. (3) I, II. Extensive exploration of a specific problem in political thought. American government, comparative politics, international relations, and public administration. May be repeated for a total of 6 hours in two sub-fields. Since topics will cover different areas in political science, prerequisites will be determined by the department as appropriate when the course is offered.

POLSC 799. Pro-Seminar in Political Science. (3) I, II. Study and analysis in various areas of the discipline with emphasis on critical evaluation of political conflicts and issues.

Graduate credit

POLSC 800. Seminar: Scope and Methodology of Political Science. (3) Exploration of theoretical foundations of political science, and critique of various analytical models in the study of political phenomena; construction and application of research designs and techniques.

POLSC 805. Seminar: American Government Problems. (3) I.

POLSC 811. Seminar: International Politics. (3) I.

POLSC 821. Seminar: Political Thought. (3) II. A study of the history of political philosophy as well as contemporary scholarship. Political philosophy as a subdiscipline of political science and its relevance for other subdisciplines as well as for leadership and administration. Class discussion and research training will focus on textual analysis, or exegesis. Course requirements include a major research paper.

POLSC 831. Seminar: Public Administration. (3) II. Pr.: POLSC 700, 708, 710 and 735.

POLSC 841. Seminar: Comparative Politics. (3) II.

POLSC 842. Seminar: Comparative Ideologies. (3)

POLSC 897. Internship. (Var., C/NC) I, II, S. Directed off-campus employment experience. Must be taken for a total of 3 hours.

POLSC 898. Master's Report. (2, C/NC) I, II, S.

POLSC 899. Master's Thesis. (6, C/NC) I, II, S.

For more information

For additional information and application materials please contact:
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226 Waters Hall
Manhattan, KS 66506–4030
785-532-6842
E-mail: polsci@ksu.edu
Home page: http://www.ksu.edu/polsci

Psychology

Head
Stephen W. Kiefer

Director of graduate studies
John J. Uhlarik

Graduate faculty
Mark A. Barnett, Ph.D., Northwestern University.

Thaddeus M. Cowan, (Emeritus) Ph.D., University of Connecticut.

Catherine Cozzarelli, Ph.D., State University of New York at Buffalo.

Ronald G. Downey, Ph.D., Temple University.

Jerome Frieman, Ph.D., Kent State University.

Clive J. A. Fullagar, Ph.D., University of Witwatersrand.

William B. Griffitt, Ph.D., University of Texas.

Richard J. Harris, Ph.D., University of Illinois.

Stephen W. Kiefer, Ph.D., Arizona State University.

Patrick A. Knight, Ph.D., Purdue University.

James C. Mitchell, (Emeritus) Ph.D., Ohio State University.

Charles C. Perkins, Jr., (Emeritus) Ph.D., University of Iowa.

E. Jerry Phares, (Emeritus) Ph.D., Ohio State University.

Leon Rappoport, Ph.D., University of Colorado.

Franz Samelson, (Emeritus) Ph.D., University of Michigan.

James Shanteau, Ph.D., University of California at San Diego.

Kip Smith, Ph.D., University of Minnesota.

Charles P. Thompson, (Emeritus) Ph.D., University of Wisconsin.

John J. Uhlarik, Ph.D., University of Washington.

Program

Graduate programs in psychology provide professional training leading to the master of science and doctor of philosophy degrees.

Doctoral programs are offered in several broad areas including: (1) animal learning/ physiological psychology (with concentrations in animal learning/behavior or physiological psychology/behavioral neuroscience), (2) human experimental psychology (with concentrations in human learning and memory, psycholinguistics, judgment and decision making, human factors/engineering psychology, or sensation and perception), (3) social-personality (with concentrations in social, personality, or developmental psychology), and (4) industrial/organizational (with concentrations in human-resources/personnel issues and procedures, organizational behavior and theory, and career issues).

At the master's level, students may specialize in most of the traditional areas of psychology. Students who complete the doctoral program are eligible for a variety of teaching, research, and professional positions in colleges and universities, governmental agencies, and business and industry.

Bluemont Hall houses all departmental facilities on the top two floors. These include offices, a reading room, conference and seminar rooms, equipment storage facilities, photographic space, calculating and computer space, numerous individual research rooms, group testing rooms, one-way observation suites, an undergraduate laboratory suite, shop facilities, animal running and recording rooms, colony rooms, surgery, histology and microscopy facilities, and a variety of other specialized laboratories, rooms, and support space. Numerous IBM-compatible microcomputers as well as printers and terminals connected with the university mainframe computer are also available in the department. The university is equipped with an IBM 3084Q computer system for data processing and modeling or simulation studies; remote facilities are readily accessible within the department and at various points across campus. In addition to its own "in-house" facilities, the department has access to a variety of campus woodworking, electronic, metal, and other specialized shops. The university library contains most of the important monographs in psychology, and subscriptions are maintained to most English-language periodicals and a sample of foreign-language journals. The department subscribes to some of the more widely used psychology journals and makes them available to students and faculty in the department's reading room.

Admission

For most students, the attainment of a master's degree requires two years beyond the bachelor's degree, the doctorate typically requires two or three additional years (beyond the master's degree). Prerequisites to admission into the graduate program are a superior academic record and background work essentially equivalent to the undergraduate psychology degree at Kansas State University, especially in courses in experimental psychology and statistics. In some cases deficiencies in preparation can be made up after admission to the program. A detailed description of the graduate programs, as well as additional information about financial support, can be obtained by writing to the department head.

For admission to graduate study, the university requires an undergraduate grade point average of B or better during the junior and senior years. As additional evidence of competence, the Department of Psychology requires the applicant to submit scores on the Graduate Record Examination (verbal and quantitative scores are required; and three letters of recommendation (preferably from faculty members at a previously attended institution). Students for whom English is not a native language will not be considered for admission unless they receive a score of 550 or higher on the Test of English as a Foreign Language. A TOEFL scores of less may require remedial English courses.

The Department of Psychology expects all applicants to have met the minimum standards for the bachelor's degree in psychology as recommended by the American Psychological Association. These include 18 semester hours of psychology, or its equivalent, in such courses as experimental psychology, statistics, history of psychology, personality, and so forth. Students who wish to concentrate in behavioral neuroscience must have the necessary background in the physical and biological sciences. In some prearranged cases, deficiencies can be made up after enrollment.

All doctoral candidates, regardless of special areas of interest, are expected to obtain a thorough grounding in general psychology, including theory, content, and methods. Such grounding is accomplished in part by requiring all students to take a series of basic core courses in both quantitative and substantive areas of psychology. The first two years of graduate study are typically devoted to a broad survey of the major areas of psychology, and to acquisition of certain basic research techniques. The first year of this period is spent primarily in basic courses. During the second year, students begin to satisfy related requirements, complete work on their master's thesis, and begin to develop a major area of professional interest. The third and fourth years of the doctoral program constitute a period of special training during which students are occupied to an increasing extent with pursuing their special research and professional interests. Most of their time is spent in small seminars and directed study. During this time, students must pass a final written examination that covers their major areas of interest, and complete a doctoral dissertation that constitutes an original contribution to the research literature in those areas.

Our graduate training includes an opportunity to gain supervised experience in teaching at the college level. This program provides both course work on pedagogical methods and actual experience as an instructor for introductory level psychology courses and, later, one or more of the department's core or service courses. Close interaction between the graduate student and a skilled faculty member is maintained to provide an optimum learning environment. Because most academic positions taken by our graduates involve teaching to a greater or lesser extent, this type of formal training makes our students highly competitive in the job market.

Performance standards

Graduate students' performance is evaluated twice each year in the domains of classroom work, research, and (when appropriate) teaching or research assistantship activities. Each faculty member who has had significant contact with a graduate student during the preceding semester completes a standard evaluation instrument. These are then made available to the student, who is encouraged to consult with faculty and discuss their evaluations. Finally, faculty meet as a group to formally assess each student's individual performance and progress toward a graduate degree.

Financial assistance

Departmental graduate teaching and/or research assistantships are awarded on a competitive basis. They provide stipends ranging from $7,580 to $8,300 for a nine-month period, and carry tuition reductions. They require a commitment to work a maximum of 20 hours each week, assisting one or more faculty members with their classroom duties. This allows students to carry a normal load of 10-12 hours of course work each semester. Graduate research assistantships are comparable to GTAs, except they are funded by individual faculty members' grant or contract funds. The student is assigned to a particular staff member's research project. Course loads and stipends are similar to those of GTAs. In addition, there are several fellowship programs available to outstanding applicants.

Students not supported by the Department of Psychology are often successful in obtaining assistantships elsewhere on campus. For example, recent graduate students have found employment in the Affirmative Action Office, the Center for Student Development, the Division of Continuing Education, the Office of Admissions, the Department of Management, Career and Employment Services, the Department of Marketing, the College of Business Administration, the Office of Institutional Research and Analysis, and the Graduate School.

Psychology courses

Undergraduate and graduate credit in minor field

Note: 500-level psychology courses cannot be taken for graduate credit by students in psychology graduate programs.

PSYCH 505. Abnormal Psychology. (3) I, II, S. An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Pr.: Junior standing; PSYCH 110.

PSYCH 510. Introduction to Behavior Modification. (3) II. Study of the principles of behavior modification and applications to human behavior. Emphasis on the learning principles and research in behavior modification. Pr.: PSYCH 505.

PSYCH 518. Introduction to Health Psychology. (3) II. Psychosocial factors relevant to general health maintenance, recovery from disease or injury, and the achievement of health. Topics include stress-management techniques, personality characteristics associated with disease, cognitive-emotional effects of diet and exercise, and theories of pain and pain management. Concepts of prevention and behavioral medicine are also included. Pr.: PSYCH 110.

PSYCH 520. Life Span Personality Development. (3) I, II, S. Theories and research in the development of personality from infancy through old age. Origins of personality in heredity and early experience, socialization practices, life crises and choices at various stages throughout life, and problems of aging. Pr.: PSYCH 110; sophomore standing.

PSYCH 530. Psychology of Mass Communications. (3) II. The psychological effects of mass communication on behavior and thought, including advertising, stereotyping of women and minorities, effects on children, violence and sex in the media, effects of news on behavior, and the promotion of prosocial behavior through the media. Pr: PSYCH 110.

PSYCH 535. Social Psychology. (3) I, II. Psychology of the individual in society. Survey of empirical studies and theoretical models of social perception, attitudes, and social behavior (e.g., attribution, ethnic and gender prejudice, conformity). Relationship of these topics to personal and media influence, social mores, and social systems is also included. Pr.: PSYCH 110.

PSYCH 540. Psychology of Women. (3) II. Investigation of psychological processes of women. A developmental sequence with emphasis on major life events for women. Female physiology, early socialization into sex roles, friendship, achievement motivation, sexuality, marriage, childbearing, work, and mental health. Pr.: PSYCH 110

PSYCH 543. Women's Mental Health Issues. (3) II. Investigates prevalent women's mental health issues such as incidence of depression/anxiety, eating disorders, sexuality, relationship concerns. Also covers the efficacy of traditional treatment modalities and newer therapies that target women's unique mental health needs such as feminist or nonsexist therapies. Pr.: PSYCH 505.

PSYCH 545. Consumer Psychology. (3) I. Survey of psychological principles and facts in perception, learning, attitude formation, personality, etc., as they apply to behavior of consumers. Pr.: PSYCH 110 and junior standing.

PSYCH 550. Group Dynamics. (3) II. Interaction in small groups: interpersonal sensitivity, communication, decision making, development of group structure and norms. May be organized as laboratory "process" group and require some flexibility in scheduling. Pr.: Six hours in psychology.

PSYCH 557. The Psychology of Ethnic Humor. (3) S, and on sufficient demand. Reviews the structure, dynamics, and social functions of ethnic humor. Pr.: PSYCH 110 or SOCIO 211.

PSYCH 558. Varieties of Consciousness. (3) I, S. Traditional and contemporary approaches of both Western science and Eastern metaphysics to study of ordinary mind consciousness, unusual states of awareness, and efforts to expand the powers of mind. Topics include sleep, dreaming, biofeedback, meditation, psychoactive drugs, brain area dominance. Pr.: PSYCH 110.

PSYCH 559. Psychological Testing. (3) II. Principles of psychological testing in industrial, clinical/counseling, and research environments. Topics include technical issues such as reliability, validity, norming, selection, placement, discrimination, etc. Also covers procedures for selecting, administering, and interpreting psychological tests. Pr.: PSYCH 110.

PSYCH 560. Industrial Psychology. (3) I, S. Survey of human behavior and psychological principles in an industrial/personnel context. Topics include: recruiting, selecting, and training personnel; evaluating their job performance; conducting job analyses; and implementing compensation strategies. Pr.: PSYCH 110.

PSYCH 561. Laboratory in Industrial Psychology I. (2) I. Supervised experience in personnel psychology including classifications, analysis, and evaluation of jobs. Pr.: PSYCH 560 or conc. enrollment.

PSYCH 562. Laboratory in Industrial Psychology II. (2) II. Additional supervised experience in personnel psychology including interviewing, EEOC regulations, training, and performance appraisal. Pr.: PSYCH 561.

PSYCH 563. Gender Issues in the Workplace. (3) I. Psychological experiences of women and men in the world of work, with emphasis on traditional and nontraditional sex-role behavior, sexual discrimination and harassment, and relevant socialization experiences. Pr.: PSYCH 110.

PSYCH 564. Psychology of Organizations. (3) II. Relationships between individuals, groups, and organizations. How organizational factors contribute to individual behavior, and how individuals affect groups and organizational functioning. Emphasis is on such traditional topics as work motivation, job satisfaction and other attitudes, leadership, communication, socialization, and organization and job design. Pr.: PSYCH 110.

PSYCH 580. Psychology of Sexual Behavior. (3) I, II. Study of psychological determinants and consequences of human sexual behavior; roles of personality, attitudinal and emotional factors will be emphasized. Pr.: PSYCH 110. Sophomore standing.

PSYCH 585. Basic Concepts in Clinical Psychology. (3) I. Critical analysis of the profession. Review of theoretical and empirical bases of such areas as intelligence and its measurement, personality and diagnosis, psychotherapy, and other modes of behavioral change. Pr.: PSYCH 110, 505, and 3 additional hours of psychology.

PSYCH 586. Laboratory in Clinical Concepts. (2) I. May be taken only in conjunction with PSYCH 585. Supervised practice in, demonstration of, and orientation to selected psychological techniques and practices. Pr.: Conc. enrollment in PSYCH 585.

PSYCH 587. Field Placement. (1–6) I, II, S. Supervised field experience in an agency or institutional setting in the application of psychological techniques to individuals, groups, or organizations. Regular supervision emphasizes relationship between theory and application and the evaluation of outcomes. Pr.: PSYCH 585 and 586, or 560, 561, and 562 and consent of psychological technician training committee.

PSYCH 599. Problems in Psychology. (Var.) I, II, S. Investigation of selected problems. Pr.: PSYCH 110 and consent of instructor.

Undergraduate and graduate credit

PSYCH 605. Foundations of Social Behavior. (3) II. Analysis of fundamental psychosocial processes underlying selected problems in contemporary society (e.g., effects on personality and interpersonal relations of changing sex roles, technological innovations, and historical events). Pr.: PSYCH 350. (Psychology majors only)

PSYCH 620. Psychology of Personality. (3) I. Discussion of different approaches to the study of personality. Pr.: PSYCH 350.

PSYCH 625. Engineering Psychology. (3) I. The role of behavioral factors in the design and operation of machines and equipment. Pr.: PSYCH 110, STAT 330, or 707.

PSYCH 630. Human Neuropsychology. (3) II. Study of brain-behavior relationships in humans. Brief review of human neuroanatomy followed by a major emphasis on brain function in learning, memory, language, and other cognitive behaviors. Also includes an examination of behavioral alterations following brain damage. Pr.: BIOL 198 and PSYCH 110, or consent of instructor.

PSYCH 650. Psychology of Language. (3) I. Experimental study of language, including sentence comprehension and memory, language acquisition and development, speech perception, and effects of context, perception, reasoning, and linguistic structure on processing of language. Pr.: PSYCH 110 and junior standing.

PSYCH 715. Psychology of Aging. (3) II. The psychological aspects of human aging. An analysis of the contributions of experimental, developmental, and personality-social psychology to the study of aging. The psychopathology of aging and psychological intervention strategies are also covered. Pr.: PSYCH 110 or DAS 315 and junior standing.

PSYCH 775. History of Current Trends. (3) II. A review of the contributions of individuals and intellectual movements to the development of modern psychology. A survey of theoretical systems currently of influence. Pr.: PSYCH 110 and 9 additional hours of psychology; senior standing.

PSYCH 790. Topics in Psychology. (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor.

PSYCH 799. Problems in Psychology. (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor.

Graduate credit

PSYCH 802. Quantitative Methods in Psychology. (3) I. Examination of the nature of statistical inference in psychological research: hypothesis testing and statistical estimation, including a survey of nonparametric methods; consideration of correlational techniques useful with different kinds of psychological data. Pr.: STAT 330 or equiv.

PSYCH 803. Physiological Psychology. (3) I. An advanced survey of basic technique, theory, and research in the field of behavioral neuroscience, including memory and learning, sensory and motor processes, motivation, and sexual behavior. Pr.: BIOL 198 and PSYCH 110.

PSYCH 804. Industrial/Organizational Psychology. (3) I. Advanced survey of theory and research pertaining to human behavior in work organizations. Topics include selection, training, and evaluation of employees, job analysis and evaluation, work motivation and satisfaction, organizational structure and development, and working conditions. Pr.: PSYCH 560 or 564.

PSYCH 805. Experimental Design in Psychology. (3) II Introduction to techniques of research planning and experimental design, including critical evaluation of selected experiments. Pr.: PSYCH 802.

PSYCH 806. Psychological Measurement. (3) I. The logic and methodology underlying the construction of psychological measuring instruments from the psychophysical estimate of threshold to the scaling of complex psychological variables. Pr.: PSYCH 110 and STAT 330.

PSYCH 808. Applied Research Methods. (3) II, in even years. Examines research methods and analyses that are used in the applied psychology literature. Focuses on planning and conducting program evaluation. Pr.: STAT 330.

PSYCH 810. Learning. (3) II. In-depth study of empirical and theoretical research on basic learning principles and their effects on behavior. Pr.: PSYCH 350 or equiv.

PSYCH 812. Perception. (3) II. Various systematic approaches to perception, with emphasis on experimental and quantitative data. The role of perception in affectivity, motivation, and personality theory is stressed. Pr.: PSYCH 350 or equiv.

PSYCH 814. Advanced Cognitive Psychology. (3) I. Study of contemporary trends and research in cognition, including memory, language, problem solving, decision making, and human learning. Pr.: PSYCH 350 or equiv.

PSYCH 820. Personality Theory and Research. (3) II. A comparative examination of contemporary theories of personality as well as research findings relevant to such theories. Pr.: PSYCH 620 or equiv.

PSYCH 825. Judgmental Processes. (3) I. Examination of empirical findings and theoretical approaches to decision making and judgment with emphasis on higher cognitive processes. Pr.: PSYCH 350 and 802.

PSYCH 830. Pro-Seminar in Social Psychology. (3) I. Discussion of empirical findings and theoretical approaches to selected problem areas, such as attitude change, personality and social structure, person perception, small group processes. Pr.: PSYCH 535.

PSYCH 840. Proseminar in Occupational Psychology. (3) I, in odd years. Survey of occupational health issues for first- or second-year graduate students in health and related fields. Pr.: STAT 330.

PSYCH 841. Seminar in Occupational Health Behaviors. (3) I, in even years. Focuses on organizational and individual prevention and coping behaviors relevant to work-related health problems. Pr.: PSYCH 840.

PSYCH 842. Practicum in Occupational Health Psychology. (3) II, in odd years. Provides supervised practical experience with occupational health problems in various business, manufacturing and government settings. Students will prepare evaluative analyses of their assigned sites. Pr.: PSYCH 840 and 841.

PSYCH 860. Practicum in Psychology. (Var.) I, II, S. Supervised practical experience in applied psychology. Pr.: Consent of instructor.

PSYCH 870. Practicum in Teaching Psychology. (1–4) I, II. Supervised experience regularly teaching a college psychology course. May be repeated with consent of supervisory committee. Pr.: Graduate standing in Department of Psychology.

PSYCH 875. Industrial Psychology: Personnel Training. (3) II. An examination of the training of personnel in an organization. Topics include: determination of an organization's training needs, selection and motivation of trainees, design and evaluation of training programs, and examination of several specific strategies for accomplishing the training function. Pr.: PSYCH 560 or equiv.

PSYCH 876. Industrial Psychology: Work Motivation. (3) I. An examination of empirical findings and theoretical approaches to understanding the relationship between worker motivation and job outcomes. Pr.: PSYCH 564 or GENBA 520.

PSYCH 877. Industrial Psychology: Leadership. (3) I. Examination of current leadership theories, research, and practice in the work setting, focusing on situational approaches to leadership, leadership styles, and interactions between personal characteristics and organizational factors. Pr.: PSYCH 564 or equiv.

PSYCH 878. Industrial Psychology: Personnel Selection. (3) II. Examination of theoretical and practical issues in staffing industrial organizations, including recruitment, test validation, and other equal employment opportunity issues (test fairness, adverse impact, etc.). Pr.: PSYCH 560 or equiv.

PSYCH 879. Organizational Psychology. (3) I. An examination of the individual's role in industrial organizations and the effects of organizational variables on the individual worker. Topics include organizational communication, employee socialization, psychological climates of organizations, psychological stress in organizations, group processes and employee performance, and organizational change. Pr.: PSYCH 564.

PSYCH 880. Industrial Psychology: Performance Appraisal. (3) II. Examination of data sources, rating procedures, psychometric criteria for evaluating performance appraisal systems, and models/theories of the performance evaluation process. Pr.: PSYCH 560 or equiv.

PSYCH 899. Master's Research in Psychology. (Var.) I, II, S. Pr.: Consent of supervisory committee.

PSYCH 951. Seminar in Physiological Psychology. (1–3) Selected topics in physiological psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 952. Seminar in Sensory Processes. (1–3) Selected topics in sensory psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 953. Seminar in Personality. (1–3) Intensive discussion of current problems of theoretical and empirical interest in the field of personality. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 954. Seminar in Experimental Psychology. (Var.) Intensive discussion of a problem of current interest based on the class's study of the pertinent original literature. May be repeated with consent of supervisory committee. Pr.: PSYCH 810 or consent of instructor.

PSYCH 956. Seminar in Psychological Measurement. (Var.) Intensive discussion of a problem of current interest, based on the class's study of the pertinent original literature. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 957. Seminar in Cognitive Processes. (1–3) Selected topics in the study of human thinking and cognition. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 958. Seminar in Mathematical Models of Behavior. (1–3) Selected topics in mathematical psychology, and applications of mathematical models to behavior. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 959. Seminar in Social Psychology. (1–3) Emphasis on discussion of advanced topics of current interest in social psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 960. Seminar in Industrial Psychology. (3) I. Intensive examination of current empirical and theoretical issues in industrial and organizational psychology. May be repeated with consent of supervisory committee. Pr.: PSYCH 560 or equiv.

PSYCH 968. Seminar in Professional Problems. (1–3) Intensive study and discussion of current professional problems in psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

PSYCH 990. Internship in Psychology. (Var.) I, II, S. Pr.: Consent of the supervisory committee.

PSYCH 999. Ph.D. Research in Psychology. (Var.) I, II, S. Pr.: Consent of supervisory committee.

For more information

For additional information and application materials please contact:
Department Head
Department of Psychology
Kansas State University
492 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5302
Phone: 785-532-6850
E-mail: psych@ksu.edu
Home page: http://www.ksu.edu/psych/

Public Administration

See Political science.

Regional and Community Planning/ Environmental Planning and Management

Head
Dan W. Donelin, FASLA, AICP

Director of graduate programs in planning
Claude A. Keithley, AICP, APA

Graduate faculty
Vernon P. Deines, (adjunct) Ph.D., University of Pittsburgh.

Laurence Gerckens, (adjunct) MRP, Cornell University.

Clarence Johnson, MUP, University of Michigan.

Claude A. Keithley, MRCP, Kansas State University.

John W. Keller, Ph.D., Rutgers State University of New Jersey.

Larry Lawhon, Ph.D., Texas A&M.

Gary A. Mattson, Ph.D., University of Delaware.

Tom Phillips, (adjunct) MRCP, Kansas State University

Ray B. Weisenburger, MRP, Cornell University.

La Barbara J. Wigfall, MCRP, Harvard University.

John Wilhm, (adjunct) MRCP, Kansas State University

Master of regional and community planning

The Department of Landscape Architecture/ Regional and Community Planning offers a 48-credit hour program leading to the degree master of regional and community planning. The program can be completed with four semesters of course work and a recommended summer internship between the first and second years. The program is fully accredited by the Planning Accreditation Board of the American Planning Association and the Association of Collegiate Schools of Planning through December 31, 2000.

The primary objective of the MRCP program is to educate women and men to become directors or managers of community development/planning departments, economic development agencies, housing or related departments and agencies in cities, small communities, counties and regions. Some graduates may use the same educational background to become directors of planning or related activities in private consulting firms and research organizations, while others may enter the field of real estate development and a host of related disciplines.

The second major objective of the program is to integrate the concept of comprehensive community development planning in an environmental context with considerations for social, economic, cultural and political issues in the community while recognizing the importance of financial management, private enterprise-government relations, and citizen participation in community decision making. Core courses reflect the impact of these key concerns on traditional planning activities, while exploring related ethical issues in depth.

With a firm educational foundation in basic planning and analytical techniques, management, human relations, and ethics, today's MRCP graduate will have the skills and judgment to become tomorrow's successful practicing planner.

Program requirements

A program of study must be filed by all graduate students pursuing a master's degree. The program of study is a planning document developed by the student, the major professor, and the supervisory committee, which outlines the course work that the student must complete in order to develop adequate expertise in "planning" and be awarded the MRCP degree.

Study leading to the two-year professional graduate degree, master of regional and community planning, requires a minimum of 48 graduate credit hours, plus a recommended internship in planning experience. Support courses are offered throughout the university, subject to the approval of the faculty.

The degree requires 30 core credit hours minimum and 18 specialization credit hours. Two (2) credit hours in PLAN 805, Internship in Planning, usually taken between the first and second year of course work, is recommended, and may be added to the program of study, above the 48 credit hour minimum. The completion of a comprehensive examination, given in the last semester in residence at K-State is required. Students may be invited to complete either a master's report (2 credit hours) or thesis (6 credit hours) by the faculty should student interest and capability exist for this option. Acceptance of this invitation for research carries an automatic substitution of the comprehensive exam with an oral presentation and defense/examination. The core course work, required for the MRCP degree is noted following.

Core course work

PLAN 605	Planning Communications	2
PLAN 631	Computer Applications in Planning 1	1
PLAN 632	Computer Applications in Planning 2	1
PLAN 715	Planning Principles	3
PLAN 752	Physical Processes of Plan Implementation	2
PLAN 753	Planning Law	3
PLAN 754	Fiscal Processes of Plan Implementation	3
PLAN 801	Planning Methods 1	2
PLAN 802	Planning Methods 2	2
PLAN 820	Planning Administration	3
PLAN 821	Community Decision Analysis	3
PLAN 826	Planning Theory, Ethics and Practice	2
PLAN 836	Community Plan Preparation	3
Total		30

Students entering the program without a design background or equivalent knowledge may be required to include the following course to the MRCP core:

LAR 500	Site Planning and Design	3 hours

During the last semester of study, students will be required to complete a comprehensive examination and to submit a specialization paper in their area of expertise according to program guidelines. One credit hour of Topics in Planning, under their major professor, is awarded for the specialization paper. No credit is given for the comprehensive examination per graduate school guidelines. Students will be expected to discuss their specialization paper with their designated committee at the completion of the comprehensive exam session. Work on the specialization paper usually begins in the third semester to ensure timely completion. At various times throughout the program, students will be given mini-components of a traditional comprehensive exam to determine progress in synthesizing concepts and methods. The analysis diagnostic will be administered at the completion of PLAN 802 and 632 for the purpose of insuring a good grasp of the use and interpretation of analytical techniques developed in the methods/computer applications sequence of courses.

Specializations in the planning curriculum

The specialized course work, or emphasis areas, may be in any one of two regular specializations listed, or, in the case of uniquely qualified students, a larger range of independent specializations designed by the student's academic advisor and committee. The specialization strengths in the department are as follows, with recommended courses listed for consideration under each specialization title:

1. *Community planning and development*

Suggested for the community planning and development specialization: Select 11–15 credit hours from the restricted electives list below, and 5 credit hours minimum from one of the three emphasis areas.

Restricted electives

General: (Select 3 credit hours minimum)

PLAN 615	Shaping the American City	3
PLAN 655	Land Development Planning	3
PLAN 716	Sem Planning	1–2
PLAN 721	Infrastructure Plan & Dev Review	3
PLAN 731	Solid Waste Planning and Management	1
PLAN 760	Community Development Planning	3
PLAN 761	Community Development Workshop	1–3
CE 570	Transportation Planning	2–3

Contextual: (Select 3 credit hours minimum)

PLAN 651	Planning Municipal Services	3
PLAN 755	State and Regional Planning	3
ECON 555	Urban and Regional Economics	3

Housing: (Select 3 credit hours minimum)

PLAN 650	Housing and Development Programs	3
IDH 725	Community Housing Assessment	3

Techniques: (Select 2 credit hours minimum)

LAR 758	Land Resource Information Systems	3
GEOG 508	Fundamentals of GIS	3
PLAN 630	Computer Applications (CAD/GIS)	1–3
PLAN 633	Computer Applications in Planning III	1
PLAN 815	Sem Planning	1–2
CE 686	Regional Planning Engineering	3
CE 771	Urban Transportation Analysis	3

Emphasis area electives

Approved graduate "emphasis" electives (minimum) selected from the three emphasis areas noted below: 5

Rural planning emphasis: (Select 5 credit hours minimum)

PLAN 640	Community Growth Management	3
PLAN 740	Small Community and Rural Area Planning	3
PLAN 780	Planning in Developing Areas	3
LAR 652	The Small Community in the Plains States	3
SOCIO 533	Rural Society	2–3
GEOG 555	Urban and Rural Geography	3

Urban planning emphasis: (Select 5 credit hours minimum)

PLAN 620	Urban America	1
PLAN 748	Urban Visual Analysis	3
SOCIO 532	Urban Sociology	3
POLSC 618	Urban Politics	3
GEOG 750	Urban Geography	3
FINAN 552	Real Estate	3

Design emphasis: (Select 5 credit hours minimum)

PLAN 745	Urban Design and Preservation Plan Theory	3
PLAN 746	Urban Design and Preservation Planning Studio	4
PLAN 748	Urban Design and Prescrvation Plan Field Study	1–3
LAR 635	Golf Course Design	1–4
LAR 646	LA Design Studio V	4
LAR 735	Advanced Golf Course Design	1–4
LAR 744	Community Site Planning	3
LAR 746	Urban Design Studio 1	4
LAR 747	Urban Design Studio 2	4
LAR 756	Design of Parks and Recreation Areas	3
LAR 757	Design for Special Populations	3
ARCH 656	Preservation Documentation	3
ARCH 657	Preservation Principles	3
ARCH 680	Development Analysis	3

Total emphasis area hours	5–8
Total restricted electives	11–15
Total core hours	30
Total hours MRCP	48 (minimum)

2. *Regional resource planning and management*

Suggested for the regional resource planning specialization: Select 11 credit hours minimum from the following list of restricted electives and an additional 7 hours from either the emphasis areas listing or from the restricted electives for a total of 18 credit hours.

Restricted electives:

General: (Select 3 credit hours minimum)

BIOL 529	Fundamentals of Ecology	3
GEOG 760	Human Impact on the Environment	3
GEOG 720	Geography of Land Use	3

Contextual: (Select 3 credit hours minimum)

PLAN 640	Community Growth Management	3
PLAN 731	Solid Waste Planning and Management	1
PLAN 755	State and Regional Planning	3
LAR 720	Public Lands and Natural Resources Law	3

Resource economics: (Select 3 credit hours minimum)

ECON 527	Environmental Economics	3
AGEC 525	Natural Resource and Environmental Economics	3
AGEC 610	Current Ag and Natural Resources Issues	3

Techniques: (Select 2 credit hours minimum)

LAR 758	Land Resource Information Systems	3
LAR 759	Landscape Resource Evaluation	3
GEOG 508	Fundamentals of GIS	3
GEOG 705	Remote Sensing of the Environment	3

GEOG 708	Geographic Information Systems	3
PLAN 630	Computer Applications (CAD/GIS)	1–3
PLAN 633	Computer Applications in Planning III	1
PLAN 815	Sem. Conflict Resolution and Negotiation	1–2

Emphasis areas
The student may select from any of the above listings for this specialization in regional resource planning and management or from the courses listed as available in the specialization in community planning and development option to build their own emphasis area.

Total emphasis area hours	0–6
Total restricted electives	11–18
Total core hours	30
Total hours MRCP	48 (minimum)

3. *Design your own track*

Students who have demonstrated a prior professional career or who have an academic interest in a specific planning related profession may negotiate other specializations in planning, using tracks and other external courses within the university. Independent specializations require formal coordination with one or more programs or colleges, and require coordination between the student, major professor and external committee members. Proposals for a non-traditional or non-advertised specialization interest must be submitted to the RCP faculty for approval at a general RCP faculty meeting. The minimum credit hours associated with this "design your own" track is 18 credit hours above the designated 30 credit hour planning core. Either a master's report or thesis in this particular option may be required by the faculty as a demonstration of proficiency in the selected and approved specialization area.

Some courses in the core and specialization curricula may be waived by the faculty based upon a case by case review of a student's upper-division undergraduate work, prior graduate work, and professional practice. Waiver is not a routine occurrence, however, and it does not reduce the total credit hours of course work required for the MRCP degree unless advance standing is also granted. Advance standing will not normally exceed 10 semester credit hours and must be approved by the faculty and the Graduate School. Requests for consideration of award of advanced standing must be fully documented in a request by the student and must accompany the student's application for admission to the program. Requests for course waivers based on prior experience or training is the responsibility of the student, forwarding such to the program director.

Admission requirements
Entering students are required to have a bachelor's degree from an accredited institution. Applicants with undergraduate degrees in administration, agriculture, architecture, business, construction science, economics, ecology, education, engineering, geology, geography, government, human ecology, landscape architecture, pre-law, planning, political science and sociology, and who meet the requirements of the Graduate School for admission, are fully acceptable for graduate study in planning. Applicants with other academic backgrounds may be accepted upon recommendation of the program faculty and subject to such conditions as the faculty may impose. Prerequisites for admission include satisfactory completion of an elementary statistics course or equivalent (or inclusion of a graduate level statistics course in the program of study), and evidence of an understanding of the American political system and government.

Admission to Graduate School may be in one of three categories: full standing, provisional, or probational. Recommendations regarding an applicant's qualifications and admission are made to the Graduate School by the faculty of the graduate program in regional and community planning. Final decisions regarding admission are made by the dean of the Graduate School. Admission in full standing requires a minimum grade point average of 3.0 (B average) in the last two years of undergraduate work in an institution whose requirements for the bachelor's degree are equivalent to those of Kansas State University. Applicants with GPA's between 2.65–2.99 will be considered for probational admission provided there is evidence that the applicant has the ability to do satisfactory graduate work. Provisional admission may be granted to applicants who have subject deficiencies in undergraduate preparation or if there is uncertainty in evaluating the transcripts. Normally, deficiencies will be made up by enrolling in courses for undergraduate credit. A statistics deficiency may be completed by enrolling in Stat 702 (Statistics for Social Science, or equivalent) for graduate credit and be counted toward the required 48 credit hour minimum for the MRCP degree. Those students who are admitted with a deficiency in American government will be expected to correct such deficiency based on the recommendation of the RCP faculty.

International applicants are required to take the TOEFL exam and submit results to the department for evaluation. TOEFL scores of 600 are required for entry into the graduate program in regional and community planning and for consideration of financial aid. Scores ranging from 550 to 599 will be considered for program admission, but not for financial aid from the program. The GRE is recommended, however is not required for admission to the program.

Financial assistance for graduate study
A limited number of 0.4 time teaching and research assistantships are typically available to incoming and continuing students in the program on a competitive basis. In addition, HUD funding is generally sought and received for minority and economically disadvantaged American students as a financial aid package designed to increase minority involvement in the planning profession in the United States. All international students who are awarded financial aid in the form of a Graduate Teaching Assistant must pass the Test of Spoken English (TSE), administered by the English Language Program at Kansas State University prior to the start of the fall and spring semesters.

For further information on financial aid, interested students should contact the Department of Landscape Architecture/Regional and Community Planning, as well as the Office of Student Financial Assistance, located in Fairchild Hall. Some scholarships are available to qualified applicants.

Internships and responsibilities
Graduate students in the MRCP program should consider assignment to a planning staff for a period of at least eight weeks (full time equivalent), and supervision by a professional planner with periodic reports of activities to planning faculty. This can be 2–4 semester credit hours with credit depending upon duration of internship. One credit hour is given per month of full time employment.

Career opportunities
Graduates who possess the master's degree in regional and community planning are typically employed by cities, regions, or state planning agencies, in the various community planning and/or development departments. Since "planning" is a management degree, the opportunities for planning positions or planning related positions are limitless, both in the public/private realm and in geographical area of coverage and interests. Opportunities abound in the areas of city planning, regional planning, neighborhood planning, transportation planning, community economic development agencies, city management, health planning, social planning, housing departments, area agencies on aging, resource planning and a preservation of ecosystems and the environment, urban design and historic preservation agencies, geographic information system analysts, demographic analysts, research and market analysis agencies, policy analysts, private consulting organizations (architects, engineers, and land planners), land development, developers and real estate appraisers, non-profit information dispersion agencies, land use law firms, etc.

Planning as a profession deals not only with current problems in the provision of our quality of life, but also the future problems and growth management to insure that the future contains a better quality of life for future generations. Through planning there is the promise and hope of a better tomorrow. To not only participate in the process, but to make things happen for future generations, the planning profession is poised to lead the way. Planning is a change element in evaluating alternative outcomes and in directing the course of future actions to insure the controlled progress of humanity, both in the social, political, economic and physical aspects of life. The master's degree in

regional and community planning is but one of the keys to understanding the past and managing the future on Planet Earth.

Master of arts in environmental planning and management

The Department of Landscape Architecture/ Regional and Community Planning offers a master of arts in environmental planning and management, based in the graduate program in regional and community planning, and delivered in cooperation with other departments and colleges on campus. The MA program is a 30 credit hour program which contains portions of the MRCP core curriculum, with specified electives selected from other university offerings.

The format of the program delivery focuses on the distance learning environment, using emerging televideo, teleconferencing and multimedia technology, locally, to broadcast the course to targeted sites, similarly equipped to receive delivery of electronic audio and video, within Kansas. This program was initiated in response to an indicated need by the U.S. Department of Defense, and would support a diverse student clientele of state and local government employees seeking continuing education in their areas of expertise, as well as selected military personnel seeking a greater understanding of the impacts of their actions on the environment. Efforts to provide a route to the MRCP, an accredited degree offered by the graduate program in regional and community planning, with additional study in residency at K-State, is an integral part of the MA program design. The basic requirements for the master of arts in environmental planning and management are as follows:

Core requirements:
Successful completion of the following courses with a minimum overall grade requirement of 3.0:

Core: required 8 credit hours

PLAN 640	Growth Management	3[3]
PLAN 715	Planning Principles (MRCP Core)	3[3]
PLAN 826	Planning Theory, Ethics and Practice (MRCP Core)	2
PHILO 595	Environmental Ethic (including prerequisites)	3[4]
	or	
LAR 741	Problems/Foundations of Environmental Planning	3[3]

General management: Select 3 credit hours minimum

PLAN 651	Planning Municipal Services	3[3]
PLAN 820	Planning Administration (MRCP Core)	3[3]
POLSC 735	Public Organizational Theory	3[4]
POLSC 708	Public Personnel Administration	3[4]
SOCIO 546	Bureaucracy in Modern Societies	3[4]

Legal process: Select 2 credit hours minimum

LAR 720	Public Lands and Natural Resources Law	3[4]
PLAN 752	Physical Process of Plan Implementation (MRCP Core)	2
PLAN 753	Planning Law (MRCP Core)	3[3]

Information management: Select 3 credit hours minimum

LAR 758	Land Resource Information Systems	3[4]
LAR 759	Landscape Resource Evaluation	3[4]
GEOG 508	Fundamentals of Geographic Info Systems	3[4]
GEOG 705	Remote Sensing of the Environment	3[4]

Total core hours required: 16

Restricted elective options:
The master of arts degree program recognizes that many courses offered within the university community are suitable for expanding the knowledge base of the student in an environmental planning and management option. As such, successful completion of 12 credit hours of elective courses, with a minimum cumulative grade point requirement of 3.0 is included, as well. Courses may be selected from the following offerings within the university:

Contextural: Select 3 credit hours minimum

PLAN 615	Shaping the American City	3[1]
BIOL 529	Fundamentals of Ecology	3[4]
GEOG 760	Human Impact on the Environment	3[1]
GEOG 720	Geography of Land Use	3[1]
GEOG 725	Geography of Water Resources	3[1]
SOCIO 536	Environmental Sociology	3[4]

Economic issues: Select 3 credit hours minimum

PLAN 754	Fiscal Process of Plan Implementation (MRCP Core)	3[3]
PLAN 755	State and Regional Planning	3[3]
ECON 527	Environmental Economics	3[4]
AGEC 525	Natural Resource and Environmental Economics	3[4]
AGEC 610	Current Agricultural and Natural Resources Issues	3[4]
POLSC 710	Policy Analysis, and Evaluation	3[1]

Physical planning: Select 6 credit hours minimum

PLAN 655	Land Development Planning	3[3]
PLAN 721	Infrastructure Planning and Development Review	3[3]
PLAN 731	Solid Waste Planning and Management	1[3]
LAR 500	Site Planning and Design	3[4]
LAR 635	Golf Course Planning and Design	2[2]
LAR 660	Landscape Rehabilitation of Disturbed Lands	3[4]
LAR 756	Design of Parks and Recreation Areas	3[4]
FINAN 552	Real Estate	3[3]
CE 570	Transportation Planning	2–3[2]
CHE 650	Hazardous Waste Engineering	1[4]

Total elective requirements: 14 credit hours
Total credits required for award of the MA in environmental planning and management: 30 credit hours

Note 1: Courses so designated will be offered on the K-State campus only and cannot be delivered in a distance learning format.

Note 2: Courses so designated are offered during a winter intersession format for two weeks, meeting daily.

Note 3: Courses so designated indicate that the courses would be offered in a distance learning format.

Note 4: Courses so designated have made no commitment as to whether or not the course could be taught in a distance learning format.

Completion requirements

At the completion of the MA program, the student will be required to complete a comprehensive examination administered by the degree granting program. No credit is given for the examination per Graduate School policy. The form, content and grading of the exam will be the responsibility of an assigned three member committee, comprised of a minimum of two faculty members from within the department plus one additional committee member from the students area of concentration. The third member of the committee may be a faculty member from another department from whom a course had been taken during pursuit of the MA degree. The committee must be members of the Graduate Faculty.

Admission requirements

Admission to the MA program is predicated upon graduation from an undergraduate program with a bachelor's degree, and meeting the admission requirements of the Graduate School at Kansas State University. Regular admission requires a GPA of 3.0 during the students last two years of their undergraduate program. Probationary admission status may be granted to those applicants who have a cumulative GPA of at least 2.65 and who have shown the capability to complete graduate level course work.

Program of study requirements

Students are encouraged to select elective course work that meets the program of study requirements of the Graduate School, as outlined in Section C., Chapter 2 of the *Graduate Handbook* (*http://www.ksu.edu/grad/handbook/chap2.htm#c*).

Transfer credits from other accredited institutions of higher learning

Information concerning the transfer of credits from other accredited institutions is contained in the *Graduate Handbook*, Section D.6, Chapter 2, (*http://www.ksu.edu/grad/handbook/chap2.htm#d*).

Combining planning courses with other degree programs

To assist the student wishing to gain an exposure to the planning program and/or profession, the following represents a listing of what could be considered as a reasonable start, in gaining an insight to the benefits of planning in other degree programs. Students are encouraged to check with their advisors concerning applicability of planning course work as electives in their designated degree programs.

Students seeking entry into the management professions via the master of public administration, or master of business administration

Integration of a selection of the following RCP courses into other management programs could provide the student with an appreciation of the interrelationship between physical planning and other community based management activities in small to medium sized citics.

Course recommendations are as follows:

PLAN 615	Shaping the American City	3
PLAN 640	Community Growth Management	3
PLAN 651	Planning Municipal Services	3
PLAN 715	Planning Principles and Process	3
PLAN 740	Small Community and Rural Area Planning	3
PLAN 752	Physical Process of Plan Implementation	2
PLAN 753	Planning Law	3

PLAN 754	Fiscal Process of Plan Implementation	3
PLAN 755	State and Regional Planning	3
PLAN 760	Community Development Planning	3
PLAN 820	Planning Administration	3
PLAN 821	Community Decision Analysis	3

Selection of 15 credit hours from the above list would constitute a concentration in planning with an emphasis on community development and management.

Students in the design professions seeking a concentration in regional and community planning

Those students planning to enter the design professions upon graduation might wish to consider acquiring the minor in regional and community planning, as such may make them a better informed citizen within the community and at work.

Graduate certificate in community planning and development

Graduate students are encouraged to seek entry into the graduate certificate program in community planning and development if an interest in planning exists. The certificate is administered by the Graduate School in consultation with the department/program, and operates in a manner similar to the undergraduate minor. The intent of the certificate program is to encourage or improve the graduate students' professional knowledge of community planning and development issues. The basic requirements for the certificate are as follows:

Core requirement

Successful completion of the following planning course with a grade of B or better.

PLAN 715	Planning Principles	3

Planning elective course requirements

Successful completion of 12 credit hours of planning courses with a cumulative GPA of 3.0 and no grade below a B in any course applied to the certificate program. The courses listed below are considered appropriate for inclusion in the certificate program.

PLAN 615	Shaping the American City	3
PLAN 620	Urban America	1
PLAN 630	Computer Applications In Planning and Design	I–3
PLAN 633	Computer Applications In Planning III	1
PLAN 640	Community Growth Management	3
PLAN 650	Housing and Development Programs	2
PLAN 651	Planning Municipal Services	3
PLAN 655	Land Development Planning	2
PLAN 715	Planning Principles	3
PLAN 716	Seminar in Planning	1–3
PLAN 721	Infrastructure Planning and Development Review	2
PLAN 731	Solid Waste Planning and Management	1
PLAN 740	Small Community and Rural Area Planning	3
PLAN 745	Urban Design and Preservation Planning Theory	3
PLAN 746	Urban Design and Preservation Planning Studio	4
PLAN 747	Urban Design and Preservation Field Study	1–3
PLAN 748	Urban Visual Analysis	3
PLAN 752	Physical Process of Plan Implementation	2
PLAN 753	Planning Law	3
PLAN 754	Fiscal Process of Plan Implementation	3
PLAN 760	Community Development Planning	3
PLAN 761	Community Development Workshop	1–3
PLAN 780	Planning in Developing Areas	3
PLAN 820	Planning Administration	3
PLAN 821	Community Decision Analysis	3
PLAN 826	Planning Theory, Ethics, and Practice	3

External elective options

The graduate certificate in community planning and development program also recognizes the value of planning related coursework offered in other degree programs, thus successful completion of 3 credit hours of planning related coursework with a B grade or better from the listing below, above the 500 level if external to the student's home department, or above the 600 level within the student's home department, would be considered an acceptable substitute for one of the courses listed in the planning elective area.

LAR 500	Site Planning and Design	3
LAR 648	Landscape Architecure Design Studio VI	4
LAR 652	Small Community in the Plains States	3
LAR 720	Public Lands and Natural Resources Law	3
LAR 744	Community Site Planning	3
LAR 746	Urban Design Studio 1	4
LAR 758	Land Resource Information Systems	3
LAR 759	Land Resource Evaluation	3
ARCH 656	Preservation Documentation	3
ARCH 657	Preservation Principles	3
ARCH 680	Development Analysis	3
ARCH 703	Environmental Aesthetics	3
ARCH 720	Environment and Behavior	3
ARCH 730	Environment and Aging	3
ARCH 746	Urban Design Studio 1	4
SOCIO 531	Urban Sociology	3
ECON 555	Urban and Regional Economics	3
POLSC 620	State and Local Government	3
POLSC 618	Urban Politics	3
GEOG 508	Fundamentals of GIS	3
GEOG 705	Remote Sensing of the Environment	3
GEOG 708	Geographic Information Systems	3
GEOG 750	Urban Geography	3
CE 570	Transportation Planning	3
CE 686	Regional Planning Engineering	3
CE 771	Urban Transportation Analysis	3
IDH 610	Housing for Special Needs	3
FINAN 552	Real Estate	3

Criteria for admission and enrollment procedures:

Graduate students enrolled at K-State may apply for admission to the graduate certificate program by contacting the departmental office.

Completion of requirements:

The student will be expected to notify the departmental office of graduation status the semester prior to planned graduation from their program. The staff will notify the Graduate School of completion of all requirements for the graduate certificate and the Graduate School will insure the proper notation on the student's official transcript. The certificate will be awarded concurrent with the student's graduate degree.

Regional and community planning courses

Undergraduate credit

PLAN 315. Introduction to Planning. (3) I. The origins and evolution of planning in response to economic, social, political, and physical problems. The planning process and its relationship to the design professions and the social and behavioral sciences. Three hours recitation a week. Pr.: Sophomore standing.

Undergraduate and graduate credit

PLAN 605. Planning Communications. (1–3) I. Study and application of communication concepts and media utilized in regional and community planning, focusing on developing an understanding of graphic communication techniques, design techniques, physical development standards and models, professional report preparation, and public hearings. Pr.: Senior standing and PLAN 315.

PLAN 615. Shaping the American City. (3). II, in odd years. An examination of the history of American city planning since 1850 presented through illustrated lectures, chronologically (rather than thematically) to coincide with the manner in which we live. Specific emphases are on the evolving physical form of the city and the impact of the political, social and economic processes and decisions that helped shape the American city within the last 100 years. Pr: Junior standing or Instructor permission.

PLAN 620. Urban America. (1) II, in even years. A visual depiction of the urbanization of America as chronicled in film and discussion. The focus of the material is on students' reaction to the urbanization process and the impacts the process leaves in its wake. Pr.: Junior standing.

PLAN 630. Computer Applications in Planning and Design. (1–3), I, IS. The application of computer aided design concepts to design and mapping in a planning context. Basic skill development in the use of CAD software for general mapping, design, and data display, with extension to GIS software applications in the planning and design professions. Focus will be on the use and capabilities of AutoCAD, ArcCAD and ARCVIEW for design, data display and analysis. Pr.: CIS 101and Junior standing.

PLAN 631. Computer Applications in Planning I. (1) I. The application of computer concepts to problem solving and data analysis in the planning profession, including the development of user skills in the application of various software packages for data analysis. Included is an extension of the basic knowledge level to advanced spreadsheet design for demographic and economic analysis used in the planning profession and the use of basic programs. Pr.: CIS 101, CIS 102, CIS 103 (or equivalent experience), and concurrent enrollment in PLAN 801.

PLAN 632. Computer Applications in Planning II. (1) II. The application of computer concepts to public presentations in the planning profession, including the development of user skills in the application of various software packages for producing multimedia presentations. Included are elements of producing video and multimedia presentations of planning projects for use in public meetings. Material developed in PLAN 631, 801 and 802 form the subject matter of the presentations. Pr.: PLAN 631 (or equivalent experience), and concurrent enrollment in PLAN 802.

PLAN 633. Computer Applications in Planning III. (1) II, IS. The application of computer concepts to planning project management, including the development of user skills in the application of various software packages for producing project management reports. Network analysis techniques of PERT, CPM and Gantt Charts are explained and applied to the development of planning process flow diagrams, time management and work scheduling. Pr.: CIS 101 and Junior standing.

PLAN 640. Community Growth Management. (3) II, in even years. Study of the process of city growth and change in relation to planning techniques and socio-economic-political determinants. Criteria and methodology for the growth management are reviewed and applied to the contemporary city. Pr.: PLAN 315.

PLAN 650. Housing and Development Programs. (2) II. Review and evaluation of historical and current housing issues, production, and financial systems, including consideration of racial, ethnic, income, and gender issues as they relate to the role of housing developments and programs in community development. Pr.: PLAN 315.

PLAN 651. Planning Municipal Services. (3) I, (in even years). An investigation of the socio-political, spatial and bureaucratic issues related to the planning, financing and delivery of municipal services. The key focus is on how planners provide technical information on such topical issues as equity standards, citizen participation and citizen demand-making models as they impact site selection of parks, libraries, fire stations, and other municipal projects. Pr.: PLAN 315.

PLAN 655. Land Development Planning. (2) II, by-annually in odd years. Examination of the process of land development in the United States, and its impacts from the perspective of developers, financial institutions, community planners, and city administrators. Focus is on the understanding of the land development process in meeting community goals, and shaping land development to meet community expectations for the improvement of the community. Conflict resolution and negotiation skills represent a communication emphasis. Pr.: PLAN 315

PLAN 699. Special Studies in Planning. (1–3) I, II, S. Independent study on special topics of interest in planning and the planning environment. Within context, special course offerings that would appeal to both graduate and undergraduate students may be offered, on demand. Pr.: Plan 315.

PLAN 715. Planning Principles. (3) I. Examination of the principles and process of regional and community planning, including historical development of growth patterns and form, the role of the architects, landscape architects, geographers, politicians and government, engineers and planners in the historical development of regions and cities. The role of citizen involvement and interaction with community leaders and planners in the planning process, as well as the concept of individual rights versus the right of governmental units to regulate development in the best interest of the general public is explored. Visionary concepts and "Utopia" are examined in the context of creating sustainable futures through planning. Pr.: Senior or graduate standing.

PLAN 716. Seminar in Planning. (1–3) I, II, S, IS. Discussion of contemporary issues in planning within the framework of professional education as a basis for understanding how planners approach societal issues in practice. Pr.: PLAN 315.

PLAN 721. Infrastructure Planning and Development Review. (2) II. Examination of infrastructure systems, and development standards; consideration of policy options and strategies; and implementation of community development through infrastructure planning and development review. Elements of site design are presented to provide the evaluative basis of site plan review as required in practice. Pr.: PLAN 315.

PLAN 731. Solid Waste Planning and Management. (1) II, IS. The focus is on federal and state policies and programs for solid waste management as a framework for private sector and local government response to solid waste issues for resource recovery (recycling, incineration and composting) and landfilling. Pr.: PLAN 315.

PLAN 740. Small Community and Rural Area Planning. (3) I. Synthesis of small community and rural area change, including socio-economic-political determinants as bases for community design and planning. Pr.: PLAN 315, plus nine credit hours in economics, political science and sociology.

PLAN 745. Urban Design and Preservation Planning Theory. (3), 1. Review of recent historical developments of urban form and space, presented through lecture and accompanying slide show. Criteria and methodology for urban design, planning and the role of historic preservation are examined and applied to the elements of cities. Pr.: PLAN 315.

PLAN 746. Urban Design and Preservation Studio. (4) II. An inter-disciplinary design studio involving large scale design projects having an extensive time implementation sequence, and components of historic significance that must be resolved within the design process. Design methods are applied to selected urban areas of the Midwest. Pr.: PLAN 315. PLAN 745 desirable but not mandatory.

PLAN 747. Urban Design and Preservation Field Study. (1–3) I, II, S, IS. (On demand) Field investigation of varied large-scale institutions, central business districts, and other mixed-use developments which may or may not include structures of historic significance that should be preserved. Pr.: PLAN 745.

PLAN 748. Urban Visual Analysis. (3) II, offered bi-annually in even years. Survey and analysis of urban form and space in relation to aesthetic theories and values. Methods of visual perception and analysis are reviewed and applied to contemporary urban form and space. Pr.: PLAN 745.

PLAN 752. Physical Processes of Plan Implementation. (2) II. Introduction to legislation and interpretation of codes and ordinances related to planning, design, and construction. Focus is on the planning process and technical studies of housing, land use, building condition, and parking, as well as staff responsibilities in professional practice Pr.: PLAN 715.

PLAN 753. Planning Law. (3) I. Examination of the evolution and current state of land use regulation within constitutional limits. Introduction to zoning, subdivision, and other police power controls within the comprehensive planning process. Pr.: PLAN 715.

PLAN 754. Fiscal Processes of Plan Implementation. (3) II. An examination of the means by which comprehensive development plans can be implemented. The focus will be on the methods of financing various community based activities envisioned in the long range planning process, including a study of the roles of bonds, taxation and intergovernmental grants. Resource allocation analysis and impact assessment will also be explored in regard to relevance to the capital budget and capital improvement plan. Pr.: PLAN 715.

PLAN 755. State and Regional Planning. (3) I., offered bi-annually in odd years. Review of the principles and elements of regional growth and change. Criteria and methodology for regional analysis and planning are examined and applied to the elements of regions. Pr.: PLAN 715 or concurrent enrollment.

PLAN 760. Community Development Planning. (3) II. Examination of past and present approaches to community development planning in the United States. Review and assessment of community development planning policies, programs and practices. Pr.: PLAN 715 or concurrent enrollment, and nine semester credit hours in the social sciences.

PLAN 761. Community Development Workshop. (Var.) I, S. The organization, planning, design, development, and evaluation of community development projects with real clients and actual locations. Pr.: PLAN 715 and PLAN 760 or concurrent enrollment.

PLAN 780. Planning in Developing Areas. (3) I. offered bi-annually in odd years. Examination of comparative regional and community systems of development, consideration of alternative approaches to planning, with emphasis on developing countries and underdeveloped areas in the rural United States. Pr.: PLAN 715, plus nine credit hours from the social sciences.

Graduate credit

PLAN 801. Planning Methods I. (2) I. Introduction to quantitative methods in planning used to measure change in the demographic characteristics of communities, and changes in the economic structure of the community. Emphasis is on the location and interpretation of Census data, population projection methodologies, and processes of community economic analysis. Pr.: PLAN 715 or concurrent enrollment, and concurrent enrollment in PLAN 631.

PLAN 802. Planning Methods II. (2) II. Expansion of the analytic techniques discussed in Planning Analysis I to include selection, collection, analysis and interpretation of planning data and the development of associated information systems. Topical coverage of such elements as community economic analysis, and presentation techniques (verbal, written, multimedia, and graphic). Includes both individual and collaborative participation. Pr.: PLAN 631, PLAN 801, and concurrent enrollment in PLAN 632.

PLAN 805. Internship in Planning. (1–4) I, II, S. Assignment to a planning staff for a period of at least 10 weeks; supervision by a professional planner with periodic reports of activities to planning faculty. Pr.: Completion of two semesters of graduate study in planning.

PLAN 810. Practicum in Planning and Development. (1–4) I, II, S. Supervised experience in professional planning and development, including internships, field research, public service, and professional workshops. Pr.: PLAN 715 or conc. enrollment, and placement on the HUD work-study program..

PLAN 820. Planning Administration. (3) I. The functions of planning administration, including city organizational structures and their relationship to the role of the planner in city administration and management. Pr.: PLAN 715 or concurrent enrollment and completion of an acceptable U.S. Government course.

PLAN 821. Community Decision Analysis. (3) II. Focus is on the analytical tools for the selection, collection, analysis, and interpretation of regional and community policy planning activities. Included is the development of survey instruments and interpretation, work flow and work measurement skills, performance standards and program evaluation techniques for policy planning and analysis at the local governmental level. Pr.: PLAN 820 and STAT 330.

PLAN 826. Planning Theory, Ethics, and Practice. (2) I. Review of the basic theories of regional and community growth and change; analysis of the process of urbanization in relation to societal determinants and environmental constraints; and the study of a process of planning for professional practice. Exploration of societal and human values in relation to issues of equity, social justice, economic welfare, and efficient use of resources, as well as ethical approaches to these issues. Pr.: PLAN 820.

PLAN 836. Community Plan Preparation. (3) II. Review of the principles and elements of city growth and change, with application to the preparation of a comprehensive community plan for a community in Kansas. Criteria, standards, and methodology for city analysis and planning are applied to the practice of planning. Emphasis is on collaborative group participation in a practical planning process using skills developed in the RCP program. Pr.: PLAN 802.

PLAN 880. Topics in Planning. (Var.) I, II, S. Independent study of selected concepts and trends in regional and community planning and development. Pr.: PLAN 715.

PLAN 899. Research in Planning. (Var.) I, II, S. Original research and advanced study in regional and community planning, urban design, and related fields for the master's report/thesis. Pr.: Registration in Graduate School and completion of two semesters of graduate study in planning.

For more information

For additional information and application materials please contact:
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Associate Head and Director
Graduate Programs in Planning
Kansas State University
302 Seaton Hall
Manhattan, KS 66506–2908
785-532-5961
Fax: 785-532-6722
E-mail: cak@ksu.edu
Home page: http://aalto.arch.ksu.edu/lar/
See Landscape Architecture in this catalog for additional information.

School Counseling

See the Student Counseling and Personnel Services section of this catalog for information about the M.S. and Ed.D. programs with an emphasis in school counseling.

Secondary Education

Chair
Lawrence Scharmann

Graduate faculty
Jackson A. Byars, Ph.D., University of Nebraska.
F. Todd Goodson, Ph.D., University of Kansas.
David Griffin, Ed.D., Kansas State University.
Steven R. Harbstreit, Ph.D., University of Missouri.
Charles Heerman, Ed.D., Oklahoma State University.
John Hortin, Ed.D., Northern Illinois University.
David Royse, Ph.D., Kent State University.
Lawrence Scharmann, Ph.D., Indiana University.
Rosemary Talab, Ph.D., University of Southern California.
Janice R. Wissman, Ed.D., University of Kansas.
Sally Yahnke, Ph.D., Colorado State University
Dean Zollman, Ph.D., University of Maryland

Admissions requirements
See Education in this catalog for more information.

Master's degree requirements
Curriculum (at least 3 hours)

EDCIP 803	Curriculum Development
EDCIP 808	Curriculum in the Inner City
EDCIP 979	Community/Junior College Curriculum

Or a curriculum course approved by the advisor.

Instructional improvement (at least 3 hours)

EDSEC 715	Reading in the Content Areas
EDSEC 786	Topic: Enhancing Instruction Through Technology
EDCIP 833	Creativity in Education
EDCIP 882	Teacher Self-Assessment
EDETC 718	Microcomputers in Instruction (2 hours)
EDETC 719	Microcomputer in Instruction Lab (1 hour)

Or an instructional improvement course approved by the advisor.

Research (at least 3 hours)

EDCIP 831	Leadership for Improved Instruction
EDCEP 816	Research Methods

Or a research course approved by the advisor.

Multicultural education (at least 3 hours)

EDCIP 730	Education of the Disadvantaged
EDCIP 733	Curriculum Materials for Ethnic Diversity
EDCIP 735	Curriculum Materials for Non-Sexist Teaching
EDCIP 910	Multicultural Curriculum Programming

Or a multicultural education course approved by the advisor.

Area of specialization (9 to 21 hours, depending on the specialization selected)
Students must select one of the following areas of specialization. The course listings that follow in each area of specialization are recommendations and may be replaced by other courses approved by the student's supervisory committee. Where a course in an area of specialization is also listed as fulfilling requirements in curriculum, instructional improvement, research, or multicultural education, that course may be used to fulfill both requirements.

Agricultural education (at least 9 hours)

EDSEC 621	Program Planning in Vocational Education–Agricultural Education
EDSEC 705	Organization Problems in Teaching Agricultural Mechanics
EDSEC 706	Principles of Teaching Adults in Extension
EDSEC 740	Advising Youth Organizations
EDSEC 822	Young Farmer and Adult Farmer Education in Agriculture
EDSEC 823	Agricultural Education for Beginning Teachers
EDSEC 840	Curriculum Development in Agricultural Education I
EDSEC 842	Curriculum Development in Agricultural Education II

Classroom technology specialty (at least 21 hours)
All courses in this specialization will be offered in the Manhattan area on weekends, in short formats in the summer, or by distance education. To enter the classroom technology specialty, an educator must have: a current teaching certificate and classroom teaching experience or equivalent; experience in using a contemporary desktop or personal computer; word processing applications appropriate to grade level being taught; regular access to a computer; access to the internet; and have a commitment through various uses of information technologies.

(1) Required (at least 11 hours)

EDADL 786	Topic: Educational Change, Technology Integration, and the Future (2 hrs.) or
EDADL 834	Strategies for Educational Change (3 hrs.)
EDSEC 786	Topic: Enhanced Instruction Through Technology (3 hrs.)
EDSEC 786	Topic: Classroom Technology Institute (1–3 hrs.)
EDSEC 795	Problems: Technology Project/Portfolio (2 hrs.)
EDSEC 886	Seminar: Current Research and Practice in Classroom Technology (2 hrs.)
EDCIP 786	Topic: Redefining Assessment (1–2 hrs.)

(2) Electives (10 hours)
A variety of 786 topics courses or 886 seminar courses are regularly planned to address classroom applications of emerging technologies such as IBM-compatible or Macintosh multimedia, electronic research, desktop publishing, integrated technology curriculum, web technologies for the classroom, and electronic portfolios.

Community/junior college (at least 9 hours)

EDCIP 832	Community/Junior College
EDCIP 943	Principles of College Teaching
EDCIP 944	Current Issues in College Teaching
EDCIP 979	Community/Junior College Curriculum

No more than three hours of topics (786) or seminars (886) in community/junior college.

Curriculum supervisor (at least 12 hours.)
To provide an adequate foundation for courses in this specialization, students are strongly encouraged to take the following courses to meet requirements in core areas of this master's degree: Curriculum EDCIP 803 Curriculum Development Research EDCIP 831 Leadership for Improved Instruction If students take the two courses listed above and the courses listed below, only EDCIP 991 Internship in Curriculum and Instruction is needed to meet the requirements for the supervisor's endorsement (granted by the State Board of Education). A list of requirements for the endorsement is available in the Office of Graduate Studies (17 Bluemont Hall). Make prior arrangements for the EDCIP 991 with the supervisor endorsement coordinator in the College of Education.

Substitutions for any course listed here must be approved by the advisor in consultation with the supervisor endorsement coordinator in the College of Education.

Student testing and educational accountability systems (3 hours):

EDCEP 715	Principles of Assessment

Addressing a specific curricular or instructional strategy (3 hours):
Several courses which satisfy this standard are listed here, but other courses may also be acceptable.

EDCIP 733	Curriculum Materials for Ethnic Diversity
EDCIP 735	Curriculum Materials for Non-Sexist Teaching
EDCIP 808	Curriculum in the Inner City
EDEL 820	Trends in Elementary School Language Arts
EDEL 821	Contemporary Mathematics in the Elementary School
EDEL 822	Trends in Elementary School Social Studies
EDEL 834	Improving Elementary Science Teaching
EDSEC 840	Curriculum Development in Agriculture I
EDSEC 844	Curriculum Development in Vocational Home Economics
EDSEC 873	The Science Curriculum
EDSEC 874	The Mathematics Curriculum
EDSEC 876	The Social Studies Curriculum in the Secondary School
EDSEC 877	The Foreign Language Curriculum
EDSEC 878	The Language Arts Curriculum

Or another course approved by the advisor

Supervisory implications of the school as a social system (3 hours):

EDCIP 907	Curriculum Theory
EDCIP 910	Multicultural Curriculum Programming
EDADL 834	Strategies for Educational Change
EDADL 886	Seminar: Historical and Philosophical Analysis of Education

Motivational research and its instructional implications (3 hours):

EDCEP 829	Learning Principles for Effective Teaching
EDCEP 912	Psychological Bases of Educational Thought and Practice
EDCEP 920	Advanced Educational Psychology: Learning

Educational computing, design, and telecommunications (at least 12 hours)
Required (6 hours):

EDETC 886	Proseminar A (3 hours)
EDETC 886	Proseminar B (3 hours)

Electives (Select 6 hours from the following.):

EDETC 723	Computer Applications in Content Areas: (science, mathematics, social studies, humanities, reading, logo and problem solving, etc.)
EDETC 762	Instructional Television
EDETC 763	Instructional Design
EDETC 764	Telecommunications in Education
EDETC 786	Topics
EDETC 795	Problems in Educational Computing
EDETC 863	Interactive Systems Design
EDETC 886	Seminars—(Recent seminar topics have included: Classroom Computer Research, Design of Hypermedia for Learning, Computer Equity, Cognitive Issues in Computer Education, Design of Instructional Simulations, and Artificial Intelligence for Educators)

English as a Second Language (ESL) Program

EDCIP 733	Curriculum Materials for Ethnic Diversity
EDSEC 786	Topic: Culturally Sensitive ESL Methods and Instructional Management
EDSEC 786	Topic: Culturally Competent Assessment and Intervention for the Culturally and Linguistically Different Student
EDSEC 786	General and Applied Issues in Linguistics and Second Language Acquisition
EDSEC 786	Topic: Practicum in ESL

Or other courses approved by the advisor.

Family and consumer sciences education (at least 9 hours):
It is recommended that those choosing this specialization take elective courses (see electives section) in one or two departments in the College of Human Ecology.

EDACE 739	Coordination of Cooperative Vocational Education
EDSEC 701	Administration and Supervision of Vocational Education
EDSEC 713	Occupational Analysis
EDSEC 740	Advising Youth Organizations

EDSEC 786	Topics (Recent Topics have included Methods of Teaching Food Science and Middle-Level Home Economics.)
EDSEC 810	In-Service Education for Beginning Home Economics Teachers
EDSEC 811	Consumer Education
EDSEC 834	Trends in Home Economics Teaching
EDSEC 844	Curriculum Development in Vocational Home Economics
EDSEC 864	Assessment in Home Economics Education
EDSEC 886	Seminars (Recent seminars have included issues related to Teaching Human Sexuality and AIDS Education, and Thinking Skills Strategies in the Home Economics Classrooms.)

Learning skills/school improvement (21 hours)

EDSEC 715	Reading in the Content Area
EDSEC 786	Topic: Learning Skills/School Improvement
EDSEC 786	Topic: Computers and Composition
EDSEC 991	Internship: Learning Skills
EDCIP 730	Education of the Disadvantaged
EDCIP 803	Curriculum Development
EDCIP 831	Leadership for Improved Instruction

Multicultural education (at least 9 hours)

EDCIP 730	Education of the Disadvantaged
EDCIP 733	Curriculum Materials for Ethnic Diversity
EDCIP 735	Curriculum Materials for Non-Sexist Teaching
EDCIP 910	Multicultural Curriculum Programming

No more than three hours of topics (786) or seminars (886) in multicultural education.

Multicultural/urban education (at least 15 hours)
This specialization is only for students enrolled in the Kansas City master's degree program.

EDCIP 611	Educational Sociology
EDCIP 725	The Teacher and Child Abuse
EDCIP 737	Drug Abuse Education
EDCIP 886	Seminar: Mental Health and the Curriculum
EDEL 816	Approaches to Reading Instruction
EDETC 756	Visual Communication
EDSEC 811	Consumer Education

Or other courses approved by the advisor.
Students selecting this specialization must complete an additional six hours of the following course to work on their research paper: EDSEC 795 Problems in Urban Education.

Secondary education
(At least 9 hours total: at least 3 hours from the list below plus 6 additional hours from this list or from the teaching specialty.)

EDCIP 805	Curriculum Construction for Elementary and Secondary Schools
EDSEC 614	Laboratory Techniques in the Teaching of Science
EDSEC 715	Reading in the Content Areas
EDSEC 873	The Science Curriculum
EDSEC 874	The Mathematics Curriculum
EDSEC 876	The Social Studies Curriculum
EDSEC 878	The Language Arts Curriculum
ART 690	Techniques in Teaching Art

Vocational education (at least 9 hours)

EDSEC 611	Coordination Techniques
EDSEC 612	Job Analysis
EDSEC 620	Principles and Philosophy of Vocational Education
EDSEC 701	Administration and Supervision of Vocational Education
EDSEC 704	Extension Organization and Programs
EDSEC 713	Occupational Analysis
EDSEC 732	Practicum in Career Education
EDSEC 735	Practicum in Business and Office Occupations
EDSEC 740	Advising Youth Organizations
EDSEC 811	Consumer Education
EDSEC 910	Occupational Experience Supervision

Secondary education courses

Undergraduate and graduate credit in minor field

EDSEC 502. Independent Study in Secondary Education. (1–3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department chair.

EDSEC 503. Teaching Adult Classes in Agriculture. (2–3) On sufficient demand. Organization and preparation of materials and methods used in teaching adult classes in vocational education in agriculture for young farmers and adults. Departments are visited for evaluation of programs and results. Pr.: EDSEC 620.

EDSEC 505. Field Experience in Agricultural Education. (2–3) On sufficient demand. A course for prospective teachers to help bridge the gap between classroom theory and student teaching. Emphasis will be on observation of and participation in school and community organizations and programs. Pr.: EDSEC 300 and FSHS 110 and consent of instructor.

EDSEC 560. Art for Exceptional Children. (3) II. Use of art courses and activities to meet the needs of the mentally retarded, physically impaired, emotionally disturbed, or gifted child. Three hours lec. Pr.: PSYCH 110. Same as ART 560.

EDSEC 576. Safety Education. (2) II, S. Personal safety in home, school, community, and work place will be addressed. Special attention is given to local, state, and national resources related to safety practice and safety education.

EDSEC 582. Teaching Participation in Music. (8–12) I, II. Observation and teaching under the direction of selected music teachers in elementary, middle level, and secondary school music programs. Pr.: Admission to student teaching.

EDSEC 586. Teaching Participation in Secondary Schools and Professional Development Seminar. (Var.) I, II. Guided observation, teaching participation, and study of teaching practices under direction of selected teachers in middle/junior and senior high schools. Student teachers will participate in seminar sessions to discuss issues and experiences encountered during this school-based experience. Pr.: EDSEC 420, 476, and 477. Simultaneous enrollment required for EDCIP 455, EDCEP 525, and EDSEC 586.

EDSEC 587. Supervised Practicum for Athletic Coaches. (2) I, II. Observation and coaching participation under the direction of selected coaches in public school, club, city recreation, or other nonpublic school sport settings. Pr.: KIN 250, 315, and one coaching and officiating course.

Undergraduate and graduate credit

EDSEC 611. Coordination Techniques. (1) II. Acquaints students with techniques in selecting, implementing, and coordinating occupational programs between the school and the business community. Pr.: EDSEC 620.

EDSEC 612. Job Analysis. (1) Acquaints students with techniques of analyzing jobs and tasks related to occupations. Pr.: EDSEC 620.

EDSEC 614. Laboratory Techniques in Teaching Science. (3) I, II. Rationale for laboratory in secondary school science. The design and implementation of laboratory activities and demonstrations in a high school science program. Pr.: EDSEC 476 (Science).

EDSEC 615. Laboratory and Safety Techniques in Teaching Agriculture. (3) I. The course is designed to provide students with the knowlege and skills necessary to design, organize, and conduct programs in agricultural laboratory instruction in secondary agricultural education programs. Students will gain experiences in the development of laboratory lesson plans, safety and technical demonstrations, student managmennt in a laboratory setting, laboratory design, and laboratory curriculum development. Pr.: Conc. enrollment in EDSEC 420 Block II Lab/Ag.

EDSEC 620. Principles and Philosophy of Vocational Education. (3) I, II, S. Provision for vocational education in Kansas and other states and countries; principles and philosophy underlying such education, relation of vocational education to school objectives and community, state, and national needs. Pr.: EDCEP 315.

EDSEC 621. Program Planning in Vocational Education. (2–3) I, II, S. The program development and planning process; development of guides for teaching and evaluating reimbursable secondary programs. Pr.: EDSEC 620.

EDSEC 701. Administration and Supervision of Vocational Education. (2–3) II, S. On sufficient demand. Emphasis on the duties and responsibilities of administrative and supervisory personnel responsible for the promotion, development, and coordination of comprehensive vocational-technical education programs at the local level. Pr.: Teaching experience or consent of instructor.

EDSEC 704. Extension Organization and Programs. (3) I, S. Development and objectives of Cooperative Extension and other university adult education programs; with emphasis on programs and procedures. Cross-listed as EDSEC/EDACE 704. Pr.: Senior standing or consent of instructor.

EDSEC 705. Organization Problems in Teaching Agricultural Mechanics. (Var.) On sufficient demand. Analysis of the agricultural mechanics course of study; needs and interests of students; learning difficulties; skills and technical knowledge required; correlation with agriculture; application of laws of learning to the teaching process; determination of objectives. Pr.: EDSEC 586.

EDSEC 706. Principles of Teaching Adults in Extension. (3) II, S. Methods and principles of adult teaching with emphasis on Cooperative Extension Service; application to various adult education programs. Cross-listed as EDSEC/EDACE 706. Pr.: Senior standing, juniors by consent of instructor.

EDSEC 710. Occupational Home Economics Education. (2) I. Principles and procedures in planning and organizing home economics-related occupational programs. The course includes an approved occupational experience in business/industry and consideration of methods and teaching materials peculiar to these programs. Pr.: FSHS 110 and conc. enrollment.

EDSEC 713. Occupational Analysis. (2–3.) I, II, S. An introduction to various techniques used in analyzing occupations and jobs. Emphasis on developing and organizing related instructional materials and content. Cross-listed with EDACE/EDSEC 713. Pr. or conc.: EDSEC 620.

EDSEC 715. Reading in the Content Areas. (3) On sufficient demand. Information concerning the reading process and techniques for helping students develop reading and study skills needed in the content areas. Course is designed for classroom middle level and secondary teachers. Pr.: Senior standing.

EDSEC 732–737. Practica in Education. (1–6) On sufficient demand. Related occupational or professional experiences in approved industry, school, Cooperative Extension Service, or similar agency setting under faculty supervision. Pr.: Consent of instructor.

EDSEC 732. Career Education.

EDSEC 734. Agriculture-Related Occupations.

EDSEC 735. Business and Office Occupations.

EDSEC 736. Extension Education.

EDSEC 737. Home Economics-Related Occupations.

EDSEC 740. Advising Youth Organizations. (2–3) On sufficient demand. An examination of the role of an advisor in the effective operation of a youth organization. Pr.: PSYCH 110.

EDSEC 741. German Culture in Second-Language Learning. (3) Emphasis on the study of German culture and application to German curriculum, including the development of materials. Pr.: Twenty-four credits in 200 and above in German or equiv. (Same as GERMN 741).

EDSEC 743. French-Speaking Cultures in Second Language Learning. (3) On sufficient demand. Emphasis on the study of French culture and applications to the French curriculum, including the development of materials. Pr.: 24 credits at 200 and above in French or equiv. Cross listed with modern languages FREN 743.

EDSEC 770. Methods for Second Language Acquisition/Learning. (3) On sufficient demand. Study of the development of second language instruction, both historical and current. Syntax, morphology, discourse analysis, and global proficiency evaluation are foci for analysis of methods and for the development of a personal method of teaching. Pr.: EDSEC 476 and 24 credits in one second language at 200 level and above or equivalent.

EDSEC 775. Readings in Secondary Education. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDSEC 776. Teaching in the Middle/Junior High School. (3) On sufficient demand. Several instructional approaches consistent with the characteristics of the emerging adolescent student (grades 5-9) will be examined in relation to current research. Direct development of alternative curricular programs. Appropriate use of interdisciplinary activities and nontraditional materials will be emphasized. Pr.: EDCEP 315, middle-level field experience, elementary or secondary content methods course.

EDSEC 777. Hispanic Cultures in Second-Language Learning. (3) Emphasis on the study of Spanish culture and applications to Spanish curriculum, including the development of materials. Pr.: Twenty-four credits in Spanish at 200 and above or equivalent. Same as SPAN 777.

EDSEC 786. Topics in Secondary Education. (1–3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDSEC 791. Career Education. (2–4) On sufficient demand. Emphasis on providing for prevocational and adult experiences including orientation and exploratory and applied experiences in school and nonschool situations. Cross-listed with EDACE/EDSEC 791. Pr.: Teaching experience or consent of instructor.

EDSEC 795. Problems in Secondary Education. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

Graduate credit

EDSEC 809. The Athletic Directorship. (3) II. The administration of the intercollegiate or interscholastic athletic program with focus on the problems facing the chief administrator of the programs. Areas of study include association rules and regulations, implications or legislation, crowd control and management, scheduling, and budget. Pr.: EDSEC 359.

EDSEC 810. In-Service Education for Beginning Home Economics Teachers. (2–3) I, II, S. For beginning teachers who desire assistance with vocational program management, instructional planning and delivery, professional role development, and the organization of information related to vocational home economics teaching. Pr.: EDSEC 476 or equiv.

EDSEC 811. Consumer Education. (3) S. Evaluate syllabi and approaches to teaching consumer education. Relate consumer education to consumer economics and consumer affairs. Cross-listed with EDACE 811. Pr.: EDSEC 476 or consent of instructor.

EDSEC 822. Young Farmer and Adult Farmer Education in Agriculture. (2–3) I, II, S. Organization, objectives, and procedures of conducting young farmer and adult farmer classes. Designed for teachers in service. Pr.: Experience in teaching vocational agriculture.

EDSEC 823. Agricultural Education for Beginning Teachers. (1–3) I, II. Securing and organizing information and planning teaching activities which will help the beginning vocational agriculture teacher. Pr.: Graduation from the curriculum in agricultural education.

EDSEC 834. Trends in Home Economics Teaching. (Var.) I, II, S. Advanced study of evolving trends and materials for secondary programs; application to teaching and curriculum. Pr.: EDSEC 621 and teaching experience.

EDSEC 840. Curriculum Development in Agriculture I. (2–3) S. Curriculum problems; planning local programs in agriculture; developing facilities and plans for meeting current and advanced problems in the teaching of agriculture. Pr.: One year of teaching in agriculture.

EDSEC 842. Curriculum Development in Agriculture II. (2–3) S. Continuation of EDSEC 840. Pr.: EDSEC 840 or consent of instructor.

EDSEC 844. Curriculum Development in Vocational Home Economics. (3) I, S. The course focuses on current trends in vocational home economics curricula. Designed especially to assist home economics teachers and supervisors in the articulation of secondary programs, analysis, and development of curriculum models for specific school situations. Pr.: EDSEC 620.

EDSEC 845. Field Studies in Agricultural Education. (2–3) On sufficient demand. Planning, organizing, and coordinating the various phases of the local program of vocational education in agriculture. Pr.: Experience in teaching agriculture or consent of instructor.

EDSEC 849. Directed Professional Development/ Secondary. (5) On sufficient demand. Research and teaching under supervision in the secondary school. Open only to outstanding liberal arts graduates enrolled in the special program for the professional preparation of such graduates for teaching in critical areas in secondary schools. Pr.: Registration in Graduate School.

EDSEC 864. Assessment in Home Economics Education. (3) II, S. A study of evaluation theory and techniques for home economics educators. The primary emphasis will be placed upon program, process, and product evaluation relative to federal, state, and local home economics education programs. Pr.: EDCEP315 or equiv.

EDSEC 873. The Science Curriculum. (3) On sufficient demand. National curriculum programs and projects at both elementary and secondary levels. Evaluation of appropriateness of content as it relates to a philosophy of science education. Modes for investigating scientific phenomena and their subsequent use in teaching the processes of the scientists. Pr.: EDCIP 803.

EDSEC 874. The Mathematics Curriculum. (3) On sufficient demand. Trends in the teaching and supervision of mathematics. Analysis of literature and research relating to content, methods, and materials of mathematics education. Pr.: EDCIP 803, experience teaching mathematics.

EDSEC 876. The Social Studies Curriculum in the Secondary School. (3) On sufficient demand. New trends, materials, and ideas in teaching the social sciences, based on recent research and experimental programs. Pr.: EDCIP 803.

EDSEC 877. The Foreign Language Curriculum. (3) On sufficient demand. New trends and materials in teaching the foreign languages, based on recent research and experimental programs. Pr.: EDCIP 803.

EDSEC 878. The Language Arts Curriculum. (3) On sufficient demand. The changing scene in the teaching of English: trends, materials, and ideas in literature, composition, and grammar that have emerged from recent research and discovery. Pr.: EDCIP 803.

EDSEC 886. Seminars in Secondary Education. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDSEC 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDSEC 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDSEC 910. Occupational Experience Supervision. (3) II, S. Analysis of objectives and scope of occupational experience programs. Emphasis is placed on the organization, administration, related instructional procedures, coordination techniques, and evaluation of occupational experience programs. Pr.: Teaching experience or consent of instructor.

EDSEC 914. Technical Education. (3) I, S. An analysis of the evolving role of technical education and other postsecondary occupational education with emphasis upon principles underlying organization and practice unique to technical education. Cross-listed with EDACE/ EDSEC 914. Pr.: Graduate standing.

EDSEC 929. Supervision in Occupational Education. (2–3) I, S. Philosophy and principles of effective supervision related to occupational education programs; application of principles to problems met by student teacher supervisors. Pr.: Teaching experience or consent of instructor.

EDSEC 940. Organization and Administration of Occupational Education. (3) I, S. An overview of the organization of occupational education programs in agriculture, business, distributive education, health, home economics, trade and industry, technical, and related fields and their administration. Emphasis on federal-state-local relationships. Pr.: EDSEC 701 or consent of instructor.

EDSEC 986. Advanced Seminars in Secondary Education. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDSEC 991. Internship in Secondary Education. (Var.) I, II, S. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of department head.

EDSEC 999. Research in Secondary Education. (Var.) I, II, S. Pr.: EDCEP 817 and/or consent of instructor.

For more information

For additional information and application materials please contact:
Office of Graduate Studies
College of Education
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/Departments/SecEd/SecMenu.html
Education home page: http://www.educ.ksu.edu/

Social Work

See Sociology.

Sociology

Head
Michael F. Timberlake

Director of graduate studies
Leonard Bloomquist

Graduate faculty
Donald J. Adamchak, Ph.D., Bowling Green State.
Janet Benson, Ph.D., Brandeis.
Leonard E. Bloomquist, Ph.D., Wisconsin.
Richard M. Brede, Ph.D., Illinois.
Dana L. Britton, Ph.D., Texas.
Arpita Chattopadhyay, Ph.D., Brown.
Paul S. Ciccantell, Ph.D., Wisconsin.
Michael Finnegan, Ph.D., Colorado
R. Scott Frey, Ph.D., Colorado State.
Jacque E. Gibbons, Ph.D., Washington.
W. Richard Goe, Ph.D., Ohio State.
Stacy Nofziger, Ph.D., Arizona.

Harriet J. Ottenheimer, Ph.D., Tulane.
Martin Ottenheimer, Ph.D., Tulane.
Harald Prins, Ph.D., New School; Doctoral 1976, Nijmegen, Netherlands.
M. Antonio Riquelme, Ph.D., California–Santa Barbara.
Michael F. Timberlake, Ph.D., Brown.
Cia Verschelden, Ed.D., Harvard
L. Susan Williams, Ph.D., U. of Connecticut.

Overview

Sociology is concerned with patterns of social life and the ways people organize their activities and environment. A degree in sociology provides a wide array of career possibilities emphasizing knowledge of human behavior, group interaction, and skills in research. The Department of Sociology, Anthropology, and Social Work offers work leading to the degrees of master of arts and doctor of philosophy in sociology.

The graduate program in sociology allows opportunities to develop skills and interests in specific speciality areas while obtaining a solid grounding in sociological theory and methods of research. It offers a high level of student-faculty interaction and the opportunity to participate in supervised research.

The master's program offers a full range of sociological specialties and a broad sociological background. It is primarily intended to prepare students desiring to continue into Ph.D. programs. However, it is also appropriate for students who want to work in areas of applied research.

The Ph.D. program offers specialized training in community organization, societal change and development, social demography and criminology. All students take core courses in sociological theory and research methods. Graduates will be prepared for academic teaching and research as well as for applied social research careers.

Facilities

In addition to the university's computing center, the department has its own computer lab with direct access to the university mainframe. There are also microcomputer facilities with word processing, spreadsheet, and data base management systems.

The Population Research Laboratory is a research resource within the department. The department is active in interdisciplinary programs such as women's studies, gerontology, American ethnic etudies, international studies, and Latin American studies.

Degree programs

The master of arts degree requires a minimum of 30 graduate credit hours and normally takes two years to complete. It is offered under two options: a thesis option, including 24 hours of course work plus 6 thesis hours, and a nonthesis option of 30 hours of course work. Both options require four core courses in theory and methods and a seminar (900 level). The nonthesis option requires a second seminar and examinations in the core and in a specialty area.

The Ph.D. degree requires a minimum of 60 credit hours beyond the master's: 30 hours of course work and 30 dissertation hours. It normally takes three years of full-time work to complete. The course work includes 15 hours of core requirements and 18 hours in two major areas of concentration. Some core requirements can be met at the master's level. All students take preliminary examinations in their two areas of concentration. Preliminary examinations in their theory and methods core are waived if performance in the required courses is good.

Admissions

Transcripts from each college or university attended are required, as are a statement of purpose, three letters of reference, a sample of previous written work, and scores on the general test of the Graduate Record Examination (GRE). Admission decisions will be based on a careful evaluation of the information provided by all of these requirements. International students must also provide a TOEFL score of at least 550 on the old test or 213 on the new computerized test, plus evidence of financial support as required by the Graduate School.

The application deadline for financial support is March 1. Announcements of awards of financial support are made in early April. Applications for fall admission without financial support will be considered until August 1 for domestic students and May 1 for international students. Corresponding deadlines for the Spring term are December 1 and October 1.

Assistantships

Teaching and research assistantships are available each year. They require approximately 16 hours of work per week. All assistants must be enrolled in 6–12 hours of course work per semester, which can include hours for thesis or dissertation research.

Students awarded assistantships who make normal degree progress can expect to receive support for two years at the M.A. level and three years at the Ph.D. level.

Proseminar

All entering graduate students are required to enroll in the departmental proseminar during their first fall semester on campus. The proseminar is conducted by the graduate coordinator and consists of discussions designed to orient the graduate student to the discipline of sociology as a profession and to the department.

Graduate handbook

Details of the procedures, deadlines, and policies of the department and the graduate school on all matters pertaining to graduate study in Sociology are available in the graduate handbook, *Sociology Graduate Study*. This is mailed to prospective applicants and is available from the graduate coordinator.

Sociology courses

Undergraduate and graduate credit in minor field

SOCIO 500. Sociological Perspectives on Contemporary Issues. (Var.) I, II, S. Analysis of a selected topic of contemporary interest. Topics vary from semester to semester and might include: impact of public policy on rural life; white collar crime; student-athlete education; social change in the Third World. Pr.: SOCIO 211.

SOCIO 504. Political Sociology. (3) II, in even years. An introduction to the principles of political sociology. Processes of political socialization, participation within and outside established organizational channels, recruitment of elites, communication and influence, power, decision making, and policy outputs. Data are presented from a cross-national perspective. Same as POLSC 504. Pr.: SOCIO 211, POLSC 110.

SOCIO 505. Introduction to the Civilizations of South Asia I. (3) I. Interdisciplinary survey of the development of civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context; philosophical and social concepts; social and political institutions; literature; and historical movements. Same as HIST 505, ECON 505, POLSC 505, ANTH 505, GEOG 505. Pr.: SOCIO 211.

SOCIO 506. Introduction to the Civilizations of South Asia II. (3) II. Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including literature, geography, social and political structure, ideas. Same as HIST 506, ECON 506, POLSC 506, ANTH 506, GEOG 506. Pr.: SOCIO 211.

SOCIO 507. Political Sociology of Latin America. (3) I. A survey of the socioeconomic and political dimensions of Latin America's development in the twentieth century. Given the diversity that characterizes the region, the course adopts a comparative perspective, focusing on the experiences of particular countries in order to examine the most significant trends on the continent. Special attention is given to contemporary issues such as the process of transition to democracy; the impact of the foreign debt crisis, privatization, and free market policies. Pr.: SOCIO 211.

SOCIO 510. Social Welfare as a Social Institution. (3) I, II. The development and present status of social welfare in meeting changing human needs and the requirements in other parts of our social system; the analysis of present-day philosophy and functions of social welfare. Same as SOCWK 510. Pr.: SOCIO 211.

SOCIO 511. Comparative Social Theories. (3) I, II. Investigations of a range of current sociological theories concerning the socialization process, group behavior, and social organization. Pr.: SOCIO 211.

SOCIO 520. Methods of Social Research I. (4) I, II. Treatment of the logic and procedures involved in the formulation of a research problem and the difficulties encountered in conducting research. Examines problems of explanation and prediction, the process of inquiry, elements of the scientific method, the design of research, and analysis in the social sciences.Pr.: SOCIO 211, STAT 330 or equiv. To include 1 credit hour of lab and field research experience.

SOCIO 522. Sociological Field Methods. (3) I, II. Introduction to field/qualitative methods. Includes collection and analysis of data using techniques such as interviewing, observation, and unobtrusive measures. Taking field notes, report writing, and ethical issues are also stressed. Pr.: SOCIO 520.

SOCIO 531. Urban Sociology. (3) II. Growth, development, and structure of the city as determined by geographical, ecological, and social factors; relation of rural and urban communities; problems of the city and various approaches to their solution. Pr.: SOCIO 211.

SOCIO 532. Community Organization and Leadership. (3) I, II. The analysis of community organization and change in American communities, with special emphasis on nonmetropolitan places. Issues include the analysis of internal community organizational ties, the interaction between the local community and its external environment, and the exploration of various methods affecting community development and social change within communities. Pr.: SOCIO 211 and 520 or 519, or equiv., or graduate standing.

SOCIO 533. Rural Society. (3) I. A survey of U.S. rural society, including change in agricultural structure, rural demographic shifts, growth of the rural service sector, rural class structure, decline and transformation of rural communities, and linkages to urban society. Examination of selected rural institutions such as education and religion. Pr.: SOCIO 211 or consent of instructor.

SOCIO 535. Population Dynamics. (3) II, in odd years. World population trends and their implications for economic development, public policy, and social and cultural change. The interaction of fertility, mortality, and migration with the size, distribution, and structure of populations in nations and world regions. Pr.: SOCIO 211.

SOCIO 536. Environmental Sociology. (3) II, in even years. The interrelations among human societies, social institutions, and the biophysical environment. Emphasis on the reciprocal links among technological change, economic structure, and the ecological basis of human societies. Pr.: SOCIO 211.

SOCIO 540. Social Organization. (3) II. Principles and processes of the organization and structure of human societies. Analysis of social groups and institutions and theories of social structure. Pr.: SOCIO 211.

SOCIO 541. Wealth, Power, and Privilege. (3) II. Distribution of resources and rewards in American society. Various explanations of the causes, persistence, and effects of inequality in American life. Discussion of social mobility and current issues. Pr.: SOCIO 211.

SOCIO 542. The Social Organization of the Future. (3) On sufficient demand. Examination of alternative social arrangements presented in speculative and science fiction. Consideration of fictional extrapolations of social, scientific, and technological trends in terms of specific institutions. Analysis of possible social and interpersonal structures imaginatively conceived. Pr.: SOCIO 211.

SOCIO 545. The Sociology of Women. (3) I. The positions of women in the United States and cross-culturally are studied in order to understand what women and girls do and how that is perceived and responded to by different groups. Pr.: SOCIO 211.

SOCIO 546. Bureaucracy in Modern Societies. (3) I. The nature and types of bureaucratic organizations in modern societies. Selected aspects of their internal structure, such as peer group and hierarchical relations in organizations, processes of communication, management, and impersonal mechanisms of control. Pr.: SOCIO 211.

SOCIO 550. Introduction to Social Interaction. (3) I. A survey of theories of social interaction and social psychology with special attention to research on principles of interpersonal relations in social situations, group formation, maintenance, and change. Pr.: SOCIO 211.

SOCIO 560. Juvenile Delinquency. (3) I, II, S. Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: SOCIO 211.

SOCIO 561. Criminology. (3) I, II. Theoretical foundations of research on the nature, extent, and causes of crime; programs for prevention and treatment. Pr.: SOCIO 361 or 511.

SOCIO 565. Program and Policy Formulation and Analysis. (3) I, II. Examination of policies and programs developed to cope with various social problems. Emphasis will be on analysis of existing programs and policies and the formulation of alternative policies. Attention will be given to policy change through legislative action. Same as SOCWK 565. Pr.: SOCIO 260, 510.

SOCIO 570. Race and Ethnic Relations in the U.S.A. (3) I, II. This survey of racial and ethnic relations focuses on discrimination and conflict now as well as on background factors of the past to enlarge understanding of dominant and minority groups. Pr.: SOCIO 211.

SOCIO 580. Corrections. (3) I, II. The historical development and current status of the correctional system. Major institutional components include jails, prisons, probation, parolee, and other forms of community corrections. Modern issues such as offender and victim rights and electronic monitoring are also covered. Pr.: SOCIO 561.

Undergraduate and graduate credit

SOCIO 618. Religion in Culture. (3) II, in odd years. The nature of religion and its manifestations in different cultural systems. Same as ANTH 618. Pr.: ANTH 200 or SOCIO 211.

SOCIO 633. Gender, Power, and International Development. (3), on sufficient demand. Examination of various models of development and their impact on various roles of women and men in various cultures. Emphasis upon Africa, Asia and Latin America. Comparisons of public, service, and economics sectors, including agriculture, marketing, and industry. Examination of policy issues. Pr.: SOCIO 211 or ANTH 200 or ANTH 210 and 3 additional hours in sociology or cultural anthropology. Same as ANTH 633.

SOCIO 633. Gender, Power, and Development. (3) II, in even years. Examination of various models of development and their impact on roles of women and men in various cultures. Emphasis upon Africa, Asia, and Latin America. Comparisons of public, service, and economic sectors, including agriculture, marketing, and industry. Examination of policy issues. Pr.: SOCIO 211 or ANTH 200 and 3 additional hours in sociology or cultural anthropology. Same as ANTH 633.

SOCIO 738. Inter-American Migration. (3) I, in odd years. Analyzes the migratory experiences of Latin American and Caribbean peoples to the United States within their socioeconomic, cultural, political and historical contexts. Introduces students to the current theoretical debate on migration and the construction of U.S. immigration policies. Examines the ways in which these policies shape migrant flows to the U.S., the incorporation and community formation of immigrants, and the impacts of such communities on the development of U.S. society. Pr.: SOCIO 535 or consent of instructor.

SOCIO 640. Sociology of the Family. (3) I. Origin and development of marriage customs and systems of family organization; the preparation for family life under present conditions. Pr.: SOCIO 211.

SOCIO 643. Sociology of Religion. (3) I. On sufficient demand. The role of religion as an institution in American society. An assessment of the functions of religion and an exploration of contemporary trends and movements, including information on traditional denominations and emerging sects and cults. Pr.: SOCIO 211.

SOCIO 647. Sociology of Work. (3) II. The social nature of work and related phenomena; occupational structures; career lines; adjustment and interpersonal relations at work; significance of work in the life cycle. Pr.: SOCIO 211.

SOCIO 661. Corrections. (3) I, II. The historical development and current status of the correctional system. Major institutional components: jails, prisons, probation, parole and other forms of community corrections. Modern issues such as offender and victim rights and electronic monitoring. Pr.: SOCIO 561.

SOCIO 665. Women and Crime. (3) I, in odd years. Nature, extent, and causes of crime among women; victimization of women including domestic assault, rape and incest; women who work in the criminal justice system. Pr.: SOCIO 361 or junior standing.

SOCIO 701. Problems in Sociology. (Var.) I, II, S. Pr.: SOCIO 211 and junior standing.

SOCIO 709. Development of Social Thought. (3) On sufficient demand. Development of social thought from ancient civilization to the middle of the nineteenth century; approaches to the study of society; ideas on human origins and human nature, character and results of associative life, social trends, and social betterment. Pr.: SOCIO 211.

SOCIO 710. Systematic Analysis of Social Theory. (3) I. Examination of sociological theory with reference to the nature of scientific explanation and the function of scientific theory. Critical study and analysis of selected social theory and major social theorists with the objective of clarifying the conceptual and logical structure of underlying theoretical models and their assumptions about man and society. Pr.: SOCIO 511 or equiv.

SOCIO 742. Society and Change in South Asia. (3) II, in even years. Examines recent studies of family and community, population, mobility, urbanization, and modernization in the India-Pakistan region, with focus on social change. Pr.: SOCIO 211 or ANTH 200 and either a 500-level course in South Asian studies or one in social change and development.

SOCIO 744. Social Gerontology. An Introduction to the Sociology of Aging. (3) II. Analysis of the phenomenon of human aging in its individual, social, and cultural aspects with special attention to the problems of aging populations in Western societies. Pr.: SOCIO 211.

SOCIO 767. Social Reactions to Deviance. (3) Selected topics in the sociology of deviance, such as (1) public reactions to deviant persons and groups, (2) the nature and extent of formally organized responses to deviance, and (3) deviance considered from the perspective of deviant actors. Pr.: SOCIO 561 or graduate student standing.

Graduate credit

SOCIO 801. Introductory Proseminar. (1) I. Discussions designed to introduce entering graduate students to the discipline of sociology as a profession and to the members of the sociology graduate faculty. Required during the first fall semester on campus. Pr.: Admission to the graduate program in sociology.

SOCIO 802. Teaching Proseminar. (1) I. Designed to aid new graduate teaching assistants. Includes such topics as planning a sociology course, handling sensitive issues, leading discussions in large and small classes, use of audiovisuals, special projects, classroom deportment, designing and grading examinations. Required of first-semester GTAs. Pr.: Interest in teaching sociology and enrollment in the sociology graduate program.

SOCIO 810. Contemporary Sociological Theory. (3) II. Comparative analysis of contemporary schools of sociological thought showing their development, current status, and possible future trends. Emphasis on structural functionalism, Marxism and neo-Marxism, symbolic interactionism, phenomenology and ethnomethodology, and exchange theory. A working knowledge of classical sociological theory is assumed. Pr.: SOCIO 710 or equiv.

SOCIO 823. Intermediate Methods of Social Research. (3) II. Current sociological research techniques, strategies of research design, construction of research instruments, logic of sociological inquiry, conceptualization, problem formation, and preparation of research proposals. Pr.: Graduate standing.

SOCIO 824. Qualitative Methodology. (3) On sufficient demand. Collection, analysis, and presentation of sociological data using such methods as participant observation, ethnomethodology, community analysis, documentary research and historiography, case study, and life history. Emphasis upon formulation of problems and the execution of research. Pr.: Graduate standing.

SOCIO 825. Quantitative Methods. (3) I. Provides instruction for advanced techniques in the quantitative analysis of sociological data. Includes regression analysis and estimation of models with categorical data. A working knowledge of basic statistical concepts is assumed. Pr.: STAT 702 or equiv.

SOCIO 830. Social Demography. (3) I. The study of human population, including the social, economic, political, ecological, and cultural determinants and consequences of changes in fertility, mortality, and migration. Pr.: Graduate standing.

SOCIO 832. Sociology of Community. (3) II, in odd years. A survey of theoretical perspectives and current research on the sociology of community in the U.S. and

other countries. Examples of issues covered include community growth and decline, social inequality, community power and politics, social implications of community economic change, urbanization, and the global context of local change. Pr.: Graduate standing.

SOCIO 834. Sociology of Rural Development. (3) I, in even years. A survey of theoretical perspectives and research on changes in the social organization of rural areas, both international and in the U.S. Examples of issues covered include relationship of agriculture to other social structures and the biosphere, implications of the limits to growth for the development of rural economies, peasants and other rural social groups, and the transnational organization of food production, distribution, and consumption. Pr.: Graduate standing.

SOCIO 835. Environment and Society. (3) II, in even years. The interrelationships among population, technology, environment, and social organization. An examination of the origins and development of human ecology in sociology, and recent attempts to redefine the area. Special emphasis on current theoretical and research efforts focusing on the history and uses of ecological ideas. Pr.: Graduate standing.

SOCIO 840. Comparative Social Systems. (3) I, in even years. Compares social systems in different regions of the world. Examines models of comparative and historical sociology. Provides students with a background for conducting and evaluating comparative research. Treats such issues as socioeconomic development, group relations, and age and sex roles from a cross-cultural perspective. Pr.: Graduate standing.

SOCIO 841. Social Differentiation and Stratification. (3) I, in odd years. Analysis of societal organization based on age, sex, residence, occupation, community, class, caste, and race. Pr.: Graduate standing.

SOCIO 850. Social Control. (3) Analysis of social and institution processes and mechanisms of social control: socialization, role allocation, systems of social sanctioning, growth and dynamics of institutional systems of social control emphasizing its character at the institutional and societal level of analysis. Pr.: Graduate standing.

SOCIO 851. Social Change. (3) II, in odd years. Examination of the processes and mechanisms of societal change. Attention centers on current theoretical, methodological, and research issues. Pr.: Graduate standing.

SOCIO 852. Social Roles and Social Relationships. (3) II, in odd years. Analysis of the processes of interpersonal perception, attraction, and social interaction in the formation, maintenance, and change of social relationships and social roles. Particular emphasis is placed on the importance of such processes for the formation of social groups and social interaction in a variety of social contexts. Consideration of major theoretical approaches and their empirical foundations. Pr.: Graduate standing.

SOCIO 861. Sociology of Deviance. (I) I, in odd years. A critical examination of the nature, types, and societal reactions to deviant behavior. Special emphasis will be given to the process of stigmatization, the social construction of deviance as a social problem, and the effect of inequalities such as race, gender, class, and sexuality on the process of creating and applying deviant labels to individuals and groups. Pr.: 9 hours social science credit.

SOCIO 862. Criminological Theory. (3) II, in odd years. Focuses on traditional and contemporary criminological theories with secondary emphasis on presentation of empirical studies employing the theories under study. Theoretical integration will be stressed. Pr.: Twelve hours of social science.

SOCIO 898. Master's Report Research. (Var.) I, II, S.

SOCIO 899. Master's Thesis Research. (Var.) I, II, S.

SOCIO 901. Research Problems in Sociology. (Var.) I, II, S. Individual study and research for students admitted to doctoral standing in the Graduate School. Pr.: M.A., consent of instructor.

SOCIO 911. Seminar in Sociological Theory. (3) II. Selected topics in sociological theory. May be repeated with consent of supervisory committee. Pr.: SOCIO 710 and 810.

SOCIO 923. Methods of Social Policy Research. (3) I, in even years. Examination of principles, techniques, and design of retrospective and prospective social policy research. Pr.: SOCIO 823 or equiv.

SOCIO 925. Specialized Approaches to Sociological Research. (3) II, in odd years, on sufficient demand. Intensive examination of methodological approaches developed for analysis of sociological problems. The approaches to be examined will depend on faculty and student interests. Likely foci include estimation procedures for structural equation models, advanced techniques for quantitative analysis of categorical data, techniques for social network analysis and methods for comparative and historical analysis. Pr.: SOCIO 823 and instructor's permission.

SOCIO 931. Seminar in Demographic Methods. (3) II, in even years. Demographic processes such as fertility, mortality, and migration, with emphasis on measurements, methods, and analytical techniques. Includes the construction of life tables and population estimates and projections. Pr.: SOCIO 823 and 830.

SOCIO 932. Seminar in Comparative Community Organization. (3) I, in odd years. Recent developments in theory and research on processes affecting community organization. Topics will vary. Possible emphases include world urbanization, community linkages to regional and global systems, technology and local economic development, rural community development, and community-based collective action. Pr.: SOCIO 832 or 834 or equiv.

SOCIO 935. Seminar in Demography. (3) on demand. Consideration of selected topical areas in demography such as fertility and family planning, migration, population and development, and regional demography. May be repeated with different topic. Pr.: SOCIO 830 or equivalent.

SOCIO 940. Seminar in Social Organization. (3) II, in even years. Consideration of selected approaches to the study of societal organization, organizational theory, and analysis. Pr.: Consent of instructor.

SOCIO 944. Seminar in the Sociology of Aging. (3) Consideration of selected topics and issues in the sociology of aging such as retirement and institutional change, societal reactions to aging, population structure and socioeconomic consequences of aging populations, the social organization of leisure, the impact on social organization of services for older people, the structural and organizational consequences of widowhood, age-grading and stratification in aging populations, analysis of the impact on community structure, and organization of special institutions for older people. Pr.: SOCIO 744.

SOCIO 950. Seminar in Social Interaction. (3) II, in even years. Examination of current theoretical, methodological, and research issues and topics. Pr.: SOCIO 852, or equiv.

SOCIO 951. Seminar in Societal and Institutional Dynamics. (3) II, in even years. Analyses of change of societies and institutions; consideration of rates, degree, and direction of change, and of means employed to plan change in modern or emerging nations. Pr.: SOCIO 851 or equiv.

SOCIO 961. Methods Seminar in Criminology/ Deviance. (3) I, in even years. Examination of principles, techniques, and design of research in criminology, deviance, and corrections. Pr.: SOCIO 824 or SOCIO 825.

SOCIO 962. Topics Seminar in Criminology/Deviance. (3) II, in even years. The study of selected topical areas in criminology/deviance such as gender, race and/or class and crime; social control; domestic violence; lethal violence; victimology; issues in corrections; and issues in law. Pr.: SOCIO 861 or SOCIO 862. May repeat as topic varies.

SOCIO 999. Ph.D. Dissertation Research. (Var.)

Anthropology courses

Undergraduate and graduate credit in minor field

ANTH 505. Introduction to the Civilizations of South Asia I. (3) I. Interdisciplinary survey of the development of civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context; philosophical and social concepts; social and political institutions; literature and historical movements. Pr.: ANTH 200. Same as HIST 505, ECON 505, POLSC 505, SOCIO 505.

ANTH 506. Introduction to the Civilizations of South Asia II. (3) II. Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages, literature, geography, social and political structure, ideas. Pr.: ANTH 200. Same as HIST 506, ECON 506, POLSC 506, SOCIO 506.

ANTH 507. Folk Cultures. (3) I or II. A comparative approach to agrarian societies; the investigation of economic, political, social, and ideological aspects of peasantry. Pr.: Sophomore standing.

ANTH 508. Male and Female: Cross-Cultural Perspectives. (3) I or II. Sex roles and male-female relationships in the world's cultures. Stresses sex-role complementarity within the anthropological framework of cultural relativism. Pr.: Sophomore standing.

ANTH 510. Kinship and Marriage in Cross-Cultural Perspective. (3) II, in even years. Systems of family, marriage, descent, and sex tabus in cross-cultural perspective. Pr.: ANTH 200 or SOCIO 211.

ANTH 511. Cultural Ecology and Economy. (3) I or II. Cultural ecology and organization in the world's cultures. Discussion of environment and culture, exchange and display, money, trade and markets, and economic development and social change in selected societies. Pr.: Sophomore standing.

ANTH 512. Political Anthropology. (3) I or II. Ethnological approaches to politics in societies around the world. Structural-functional, evolutionary, and conflict theories. A comparison of the political systems of small-scale and complex societies: political modernization. Pr.: Sophomore standing.

ANTH 515. Creativity and Culture. (3) I, in even years. How ethnologists view the expressive and creative aspects of culture. A cross-cultural survey of the verbal, visual, and performing arts. Pr.: Sophomore standing.

ANTH 516. Ethnomusicology. (3) I, in even years. Ethnic, popular, and traditional musics from around the world. The course samples a wide range of stylistic traditions from Africa, Asia, Oceania, Europe, and the Americas. Emphasis is on understanding musical style in cultural context.

ANTH 517. African American Music and Culture. (3) I, in odd years. Continuity and tradition in the musical styles and cultural patterns of African Americans in the United States, the Caribbean, and South America. Music, art, religion, social organization, from African roots to modern forms.

ANTH 519. Practical Anthropology. (3) I or II. Application of anthropological principles and insights to programs of planned change, cultural innovation, and contemporary problems. Pr.: Sophomore standing.

ANTH 520. Research Seminar. (Var.) On sufficient demand. Intensive exploration of anthropological problems for both majors and nonmajors of sufficient background. High levels of individual participation. Pr.: 9 hours of anthropology.

ANTH 522. Special Topics in Anthropology. (1–4) On sufficient demand. Variable topics within cultural anthropology, linguistic anthropology, archaeology, or physical anthropology. Pr.: Consent of instructor.

ANTH 532. Central America: Its Peoples and Problems. (3) I. An anthropological perspective of the interactions of indigenous and foreign populations with an examination of the geographic, social, economic, political, and ideological bases of the problems facing Central America today. A look at the seven countries composing Central America in terms of their particular problems and unique solutions. Pr.: ANTH 200.

ANTH 533. Indians of Kansas. (3) I, in even years. Description and comparison of native cultures of the prairies and plains of Kansas. Culture contact and change in surviving tribes. Pr.: Sophomore standing.

ANTH 536. African American Cultures. (3) I or II. Description and comparison of African-derived cultural patterns in the Americas, stressing culture contact and acculturation, retention and syncretism, social and economic organization, religion, language, the arts. Pr.: Sophomore standing.

ANTH 545. Cultures of India and Pakistan. (3) I or II. Cultural survey of the contemporary tribes and Hindu caste communities in their historical and geographical context, followed by a more intense analysis of selected Indian and Pakistani village case studies stressing indigenous economic, social, political, and religious structures. Pr.: Sophomore standing.

ANTH 550. Cultures of Africa. (3) I or II. Family life, subsistence patterns, exchange systems, languages, religions, and development of the peoples of Africa.

ANTH 570. American Indian Archaeology. (3) I or II. Peopling of the New World; the Archaic period; spread of agriculture; prehistoric village community life. Specific cultural sequences of the U.S. and Arctic. Pr.: ANTH 200 or 260.

Undergraduate and graduate credit

ANTH 600. Cultural Dynamics. (3) I or II. Cultural processes and their conditions and consequences, mechanisms by which customs originate and become culturally significant; development, modification, and decline of customs and cultures; processes and consequences of intercultural contacts; applied anthropology. Pr.: ANTH 200 or consent of instructor.

ANTH 602. Anthropological Theory. (3) I or II. Review and integration of the major theoretical approaches in the principal branches of anthropology. Pr.: ANTH 200 or 210.

ANTH 604. Culture and Personality. (3) I or II. Anthropological contributions to personality study; cross-cultural comparisons of personality types, means of personality formation in different cultures; cultural change and personality. Pr.: Three hours of anthropology.

ANTH 618. Religion in Culture. (3) I. The nature of religion in different cultural systems. Pr.: ANTH 200 or ANTH 210 or SOCIO 211. Same as SOCIO 618.

ANTH 625. Independent Reading and Research in Anthropology. (1–3) I, II. Guided reading and research on a specific anthropological topic of student interest, leading to preparation of a research paper. Topic and credit to be arranged. Pr.: Three hours of anthropology and consent of instructor.

ANTH 626. Internship in Museology. (3) I, II, S. Practical professional museum experience of at least three weeks full time or 150 hours part time in the processing of collections, conservation, cataloging, archive and library maintenance, and/or planning and preparation of exhibits. Open to anthropology majors only. May be repeated once for credit if at a different museum. Pr.: ANTH 200 or 210 or 260.

ANTH 630. Indigenous Peoples and Cultures of North America. (3) II. Description and comparison of native cultures of Canada and the United States; culture contact and change among surviving groups. Pr.: ANTH 200 or 210 or 260.

ANTH 633. Gender, Power, and International Development. (3) on sufficient demand. Examination of various models of development and their impact on various roles of woman and men in various cultures. Emphasis upon Africa, Asia, and Latin America. Comparisons of public, service, and economics sectors, including agriculture, marketing, and industry. Examination of policy issues. Pr.: SOCIO 211 or ANTH 200 or ANTH 210 and 3 additional hours in sociology or cultural anthropology. Same as SOCIO 633.

ANTH 634. Indigenous Peoples and Cultures of Latin America. (3) on sufficient demand. A survey of the nature and variability of the original cultures of Latin America. Analysis of sample cultures, stressing economic, social, political, and religious structures. Pr.: ANTH 200 or 210 or 260.

ANTH 641. Internship in Applied Anthropology. (3) I, II. S. Supervised field experience of at least three weeks full time or 150 hours part time with an organization or institution in the application of anthropological approaches to problem solving and working in a professional setting. Emphasis is on anthropological skills in relation to the objectives and operations of an institution. Open to anthropology major only. May be repeated once for credit. Pr.: ANTH 519 and junior and consent of Program Coordinator.

ANTH 673. Mesoamerican Archaeology. (3) II, in odd years. Early foraging societies, the beginnings of agriculture; the rise of civilization; the classic empires of the Maya, Aztec, Tarascans, and their neighbors; relationships with the United States. Pr.: ANTH 260.

ANTH 676. Old World Archeology. (3) On sufficient demand. Study of the evolution of human culture in Africa, Europe, and Asia from its Paleolithic origins and Neolithic developments to the earliest civilizations. Artifacts, art, architecture, and archaeological sites are investigated to interpret changes in technology, economy, and culture. Pr.: ANTH 260.

ANTH 679. Archaeological Field Methods. (3) I. Archaeological site survey, site excavation, and laboratory analysis of sites and artifacts from the Manhattan, Kansas region. Field work on Saturday, 8 a.m.–5 p.m., while weather permits, laboratory work thereafter. Pr.: Consent of instructor.

ANTH 680. Survey of Forensic Sciences. (3) I, in odd years. Anthropological survey of the predominantly biological areas of forensic science, their methods and techniques, as they pertain to the application of that science to the purpose of the law. Particular emphasis will be given to perspectives about the science itself, its application to anthropology, and the unique ways in which that science may be used by law. Pr.: A life science with laboratory requirement in the College of Arts and Sciences.

ANTH 685. Race and Culture. (3), on demand. The biological meaning of race; the interrelationships of biological and cultural traits in human evolution; processes of racial formation of man; methods of classifying human races; cultural inheritance; the distinction of race, culture, personality, and intelligence; a review of modern racism; race as an evolutionary episode. Pr.: ANTH 200, 210 or 280.

ANTH 688. Paleoanthropology. (3) II, in odd years. Human origins and evolution as indicated by fossil evidence; interpretation of man-apes, Pithecanthropus, Neanderthal, Cro-Magnon, and other major fossil groups within the context of evolutionary theory, primate comparisons, and cultural evolution. Pr.: ANTH 200 or 280 or consent of instructor.

ANTH 691. Primatology. (3) I, in even years. Survey of the primate order including considerations of evolution, morphology, and behavior. Particular emphasis will be given to developing perspectives about the origin and evolution of hominids in the context of the primate order. Pr.: ANTH 280 or consent of instructor.

ANTH 694. Osteology. (3) II, in even years. Detailed study of human skeleton, with special attention to health and demographic conditions in prehistoric cultures and the evaluation of physical characteristics and genetic relationships of prehistoric populations. Pr.: ANTH 280 or consent of instructor.

ANTH 695. Laboratory in Osteology. (1), in even years. laboratory demonstration and exercise in working with skeletal material for analysis of sex, age, stature, and race. Complete metric and nonmetric analysis with consideration given to paleodemography, paleopathology in situ analysis and excavation, and preservation. Written reports on bone material remains will be necessary. Pr.: ANTH 694 or conc. enrollment.

ANTH 697. Seminar in Osteology. (2) II, in odd years and on demand. Analysis of human and nonhuman skeletal remains including age, sex, stature, race, anomalities, pathologies, trauma, metric and nonmetric traits, cause of death, and time since death. This course allows greater breadth and depth of osteological analysis than either ANTH 694 or 695, and allows for more concentration on individual methods and techniques and case studies. Pr.: ANTH 694 and 695.

ANTH 730. Field and Laboratory Techniques in Archaeology. (1–9) S. Participation in archaeological excavations; techniques, methods, and procedures in a field research situation. The laboratory work of cleaning, cataloging, analyzing, and preliminary report preparation of materials recovered. May be repeated once if the areas or problems involved are different. Pr.: ANTH 200 or 260 or consent of instructor.

ANTH 792. Field Methods in Linguistics. (3) On sufficient demand. Techniques of collecting and analyzing linguistic data in the field. Work with language consultants in class, on languages such as Swahili. Pr.: ANTH 220 or LING 280 or 600. Same as LING 792 and LG 792.

Social work courses

Undergraduate and graduate credits in minor field

SOCWK 501. Proficiency Development. (1–3) Integrative review of social work concepts and skills under faculty supervision. For single students or groups of students. Not applicable to major field requirements. Not repeatable. Pre.: Consent of instructor and superior performance in relevant course.

SOCWK 510. Social Welfare as a Social Institution. (3) I, II. The development and present status of social welfare in meeting changing human needs and the requirements in other parts of our social system; the analysis of present-day philosophy and the functions of social welfare. Same as SOCIO 510. Pr.: One course in each of the following areas: sociology, economics, and political science.

SOCWK 543. Women's Mental Health Issues. (3) II. Investigates prevelant women's mental health issues such as the incidence of depression/anxiety, eating disorders, sexuality, relationship concerns. Also covers the efficacy of traditional treatment modalities and newer therapies that target women's unique mental healthneeds, such as feminist or nonsexist therapies. Pr.: One course in women's studies, social work, psychology, or family thereapy.

SOCWK 566. Social Work in Aging Services. (3). Social work practice course focusing attention on working with institutionalized and noninstitutionalized elderly. Role of the social workers is explored in the context of physical, psychological, social, and economic aspects of aging. Skills in working with elderly are emphasized through classroom and direct practice in social work or in gerontology. Pr.: Three course hours in social work or gerontology.

SOCWK 567. Human Behavior in the Social Environment. (3) I, II. An introduction to the relationship among biological, social, psychological, and cultural systems as they affect or are affected by human behavior as it relates to social world models of practice. Emphasis on social systems understanding of human development. Pr.: SOCKW 260, BIOL 198, PSYCH 110, SOCIO 211, and ANTH 200.

SOCWK 580. Women's Perspectives on Peace and War. (2–3) Intercession only. This course will consider the issue of the participation of women in opposition to ware and weapons of war and advocacy for peaceful resolution of conflict. Readings and discussions will focus on four areas: (1) historical and contemporary women's peace movements; (2) the influence of a male-dominated societal structure on the use of violence and militarism as a means of resolving conlict; (3) the question of whether or not women are naturally more included to be peaceful; and (4) the activities, thoughts, and works of individual women in their quest for peace, within themselves, and in the world.

Undergraduate and graduate credit

SOCWK 610. Topics in Social Work. (1–3) Supervised independent study projects. Pr.: SOCWK 260 plus 6 hours of behavioral science foundation courses and consent of instructor.

For more information

For additional information and application materials please contact:
Director of Graduate Studies
Department of Sociology, Anthropology, and Social Work
Kansas State University
204 Waters Hall
Manhattan, KS 66506–4003

785-532-6865
Fax: 785-532-6978
Home page: http://www.ksu.edu/sasw/

Special Education

Chair
Mary Kay Zabel

Graduate faculty
Peggy Dettmer, Ph.D., Kansas State University.
Norma Dyck, Ed.D., University of Kansas.
Marilyn Kaff, Ph.D., University of Kansas.
Lori A. Navarrete, Ph.D., University of New Mexico.
Linda P. Thurston, Ph.D., University of Kansas.
Warren J. White, Ph.D., University of Kansas.
Mary Kay Zabel, Ph.D., University of Minnesota.
Robert H. Zabel, Ph.D., University of Minnesota.

Program

Special education programs at K-State serve three purposes: to provide support to undergraduate education students; to prepare teachers at the graduate level for teaching exceptional children and youth in special education programs; and to prepare personnel for special education administration and/or coordination of special education programs.

Kansas State University prepares special education teachers at the graduate level in four categorical areas: behavior disorders, learning disabilities, mental retardation, and education of gifted. A cross-categorical program is available in early child special education. Also, advanced programs in supervision and special education administration are available.

The Department of Special Education administers the granting of M.S. and Ed.D. degrees in special education. M.S. students may elect to write a thesis, a nonthesis report, or complete a comprehensive written examination. Ed.D. students must write a dissertation based on independent and original research.

Admissions requirements

See Education in this catalog for information about application forms, general admission requirements, and specific admission requirements for the master's and doctoral degrees.

M.S. requirements

Students pursuing a master's degree in special education are required to complete requirements for full certification in at least one categorical area of special education. However, when feasible, it is advisable to plan programs leading to certification in more than one categorical area. A minimum of 30 hours of academic credit comprising an appropriate program of study must be approved early in the student's program by the student's graduate committee and the Graduate School. The master's degree in special education generally requires about 36 hours of study, including a research seminar, a capstone course, and a thesis or comprehensive examination.

The endorsement areas that can be incorporated in the master's degree include the following: early childhood special education, mental retardation, emotional and behavior disorders, education of the gifted, learning disabilities, supervisor of special education programs, and director of special education.

Early childhood special education

For full endorsement, the student must successfully complete the following courses for recommendation from Kansas State University.

I. Foundations and identification (9 hours required)

EDSP 500	Introduction to Human Exceptionality
FSHS 810	Child Development
FSHS 815	Infant Behavior

Electives:

SPPAT 555	Language Development
EDSP 728	Characteristics of Emotional and Behavior Disorders
EDSP 724	Characteristics of Mental Retardation

II. Assessment and planning (3 hours required)

FSHS 728	Assessment of Young Children

III. Curriculum: instruction and program development (12 hours required)

Required courses (9 hours required):

EDSP 710	Education of Exceptional Individuals
FSHS 540	Curriculum for Cognitive and Language Development for Young Children
	or
FSHS 833	Advanced Program Planning.
EDSP 846	Interventions: Early Childhood Special Education

Electives:

PE 561	Adapted Physical Education
EDSP 777	Behavior Management for Exceptional Individuals
EDSP 842	Interventions: Emotional and Behavior Disorders

IV. Consulting: parent interaction (2–3 hours required)

EDSP 845	Special Ed. Programming: Parent Involvement
	or
EDSP 850	Consulting Process in Special Education
	or
FSHS 824	Parent Child Interaction: Theory and Research

V. Practicum (9 hours required)

FSHS 883	Practicum in Early Childhood Education
EDSP 885	Practicum: Early Childhood Special Education
EDSP 886	Seminar: Field Practice, Early Childhood Special Education

Education of the gifted

(30 hours required for the master's degree, 29 hours required for the endorsement) For full endorsement, the student must successfully complete the following courses for recommendation from Kansas State University.

General competencies (8–9 hours required)

Required courses (9 hours):

EDCEP 715	Principles of Assessment
EDSP 500	Introduction to Human Exceptionality
	or
EDSP 324	Exceptional Child in the Regular Classroom
EDSP 710	Education of Exceptional Individuals
	or
EDCEP 856	Guidance in the Elementary School
	or
EDCEP 822	Principles and Practices of Guidance
	or
EDCEP 858	Group Guidance

Major courses (12 hours required)

Required courses (9 hours):

EDSP 847	Curriculum for the Gifted
EDSP 750	Introduction to Education of the Gifted
EDSP 885	Practicum: Gifted

Electives (3 hours):

EDSP 787	Field Experience: Gifted
EDSP 795	Problems: Education of the Gifted
EDSP 886	Seminar: Field Practices in Gifted Education

Supporting courses (9 hours required)

Psychological principles:
Required course (3 hours):

EDCEP 829	Learning Principles for Effective Teaching
	or
EDCEP 912	Psychological Bases of Educational Thought and Practice

Electives (6 hours):

EDSP 728	Characteristics of Emotional and Behavioral Disorders
EDSP 721	Characteristics of Learning Disabilities

Skill development: Required course (3 hours):

EDSP 850	The Consulting Process in Special Education

Electives:

EDETC 718	Microcomputers in Instruction
EDETC 719	Microcomputers in Instruction Lab
EDSP 845	Special Education Programming: Parent Involvement

Program development electives

EDCIP 803	Curriculum Development
EDCIP 833	Creativity in Education

Research and theory (3 hours required)

Required course (required for MS degree only):

EDCEP 816	Research Methods
EDSP 899	Master's Research (optional)

Mild/moderate disabilities (behavior disorders, and/or learning disabilities, and/or mental retardation)

Elementary and/or secondary

Prerequisites:

Eligible for certification in elementary or secondary education, and one of the following courses:

EDSP 323	Exceptional Student in the Secondary School; EDSP 324, Exceptional Child in the Regular Classroom; EDSP 500, Introduction to Human Exceptionality

Required courses (27 hours)

EDSP 710	Education of Exceptional Individuals
EDSP 842	Interventions: Emotional and Behavioral Disorders
EDSP 843	Interventions: Academic Disabilities
EDSP 850	Consulting Process in Special Education
EDCEP 715	Principles of Assessment
EDSP 830	Assessment in Special Education
EDSP 845	Special Education Programming: Parent Involvement
EDSP 848	Transitions in Special Education

Two of the following. One must be in area of specialization.

EDSP 721	Characteristics of Learning Disabilities
EDSP 724	Characteristics of Mental Retardation
EDSP 728	Characteristics of Emotional and Behavioral Disorders

Electives: (at least 2 of the following as recommended by student's advisor)

EDSP 786	Topics: Language and Learning Disabilities
EDSP 786	Topics: Special Education in a Diverse Society
EDSP 777	Behavior Management of Exceptional Individuals
EDSP 841	Interventions: Moderately Mentally Retarded (required for MR endorsement)

EDSP 844	Special Education in Secondary Schools (required for adding secondary level endorsement to elementary level certification)
EDSP 778	Technology for Special Education
EDEL 841	Remediation of Reading Disabilities

Practicum (at least two different placements required) (6 hours)
EDSP 885 Practicum in Education of Exceptional Individuals: BD, LD, or MR (2-6 depending on placement). First placement must be at the level for which endorsement is requested (i.e., elementary or secondary). Second placement can be in a different delivery model for the area of specialization, a different categorical area, on-the-job if employed in special education, or at a different level in the area of specialization.

Externship (required for full endorsement, not required for MS) (1–3 hours)
EDSP 888 Externship in Special Education (1) Must be taken after all course work has been completed. Students will be provisionally endorsed and employed as special education teachers. Upon successful completion of this internship, students will be recommended for full endorsement.

Limitations
Special education endorsement is limited to the level of the basic certification. Individuals certified K–12 in subject areas such as art, physical education, or music must complete additional courses in elementary education if they wish to receive elementary level special education endorsement. To be recommended for endorsement, the student must have a 3.0 GPA overall in graduate work and must not receive a grade lower than a **B** in the 9 hour core courses for the area of specialization (characteristics, interventions, and practicum). The above program is subject to change depending on actions taken by the Kansas State Board of Education.

Additional requirements for a master's degree
The above program leads to endorsement in special education. Students wishing to complete the master's degree must complete at least 30 hours of graduate level credit and pass a comprehensive written examination over the program content. Committee members will recommend additional course work based on individual student need. This course work will include but not be limited to: EDSP 886 Seminar: Special Education or EDCEP 816 Research Design and Treatment of Data.

Ed.D. requirements

The student's Ed.D. program is directed by a minimum of five members of the university graduate faculty, including a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member outside the student's specialization, and one faculty member, appointed by the dean of the Graduate School, from another department within the College of Education who serves as the chair of the examination committee for the oral defense of the dissertation.

Each student's program of study is individualized with the approval of the major professor and the supervisory committee to optimize the student's interests, expertise, and professional goals. Information on the Ed.D. programs may be obtained from the College of Education Office of Graduate Studies in Bluemont Hall or from the relevant department chair.

Credit hour requirements

A minimum of 94 semester hours beyond the baccalaureate degree, including the following:

Foundations (12 hours)
For each category, take the course listed or its equivalent:

Historical and philosophical analysis of educational ideas and practice
EDADL 886 Seminar: Historical and Philosophical Analysis of Education

Techniques and interpretation of educational research
EDCEP 816 Research Methods

Social science explanations of educating a diverse society
EDCIP 910 Multicultural Curriculum Programming

Psychological bases of educational thought and practice
EDCEP 912 Psychological Bases of Educational Thought and Practice

Research courses (6 hours)
Research courses concerning methodology consistent with that required for the dissertation.

Clinical experience (12 hours)

Area of emphasis (48 hours)

Dissertation research (16 hours)
Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Residency

An academic residency is required and can be completed with one of the following options: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six additional hours of coursework completed in one intervening semester; or 24 hours of course work completed with 12 calendar months.

Preliminary examination

Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study, 3 of which must be over the foundation courses.

Special education courses

Undergraduate and graduate credit in minor field

EDSP 502. Independent Study in Special Education. (1–3) I, II, S. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department chair.

Undergraduate and graduate credit

EDSP 500. Introduction to Human Exceptionality. (3) II. Survey of history and legal aspects of service, etiologies, characteristics, and special needs of exceptional individuals.

EDSP 710. Education of Exceptional Individuals. (3) I, II. A general study of special education, with emphasis on legislation, Individual Education Plans, cross-cultural assessment and intervention, and strategies for exceptional students at the preschool, elementary, and secondary levels. Pr.: EDCEP 315 and EDSP 323 or EDSP 324 or EDSP 500.

EDSP 721. Characteristics of Learning Disabilities. (3) I, II. An explanation of important concepts and practices in the area of learning disabilities. Emphasis will be placed upon diagnosis of underlying causes and their characteristics. Pr.: EDSP 323 or 324, and EDCEP 315.

EDSP 724. Characteristics of Mental Retardation. (3) I. Etiological, psychological, sociological, and educational aspects of mental retardation. Pr.: EDSP 323 or 324, and EDCEP 315.

EDSP 728. Characteristics of Emotional and Behavioral Disorders. (3) I, II. Study of conceptional models for understanding emotional and behavioral disorders of childhood and adolescents, and their implications for educators. Pr.: EDCEP 315 and EDSP 323 or EDSP 324 or EDSP 500.

EDSP 750. Introduction to Education of the Gifted. (3) On sufficient demand. An overview of historical perspectives related to gifted child education, various facets of intellectual and creative functioning, national and state guidelines for planning and implementing gifted programs, modifying curriculum and classroom strategies to nurture gifted potential, current issues in gifted education. Pr.: EDSP 323 or 324 or 500.

EDSP 755. Guidance of the Exceptional Individual. (3) On sufficient demand. Strategies for teachers in working with the academic, vocational, personal, and social adjustment of the exceptional individual. The course will focus on the individual in preschool, elementary, secondary, post-secondary, and adult settings. Pr.: EDSP 722 or 763.

EDSP 775. Readings in Special Education. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDSP 777. Behavior Management for Exceptional Individuals. (3) II. Theoretical and practical applications of behavior analysis with emphasis on preventing and remediating behavior problems of students with disabilities. Pr.: EDCEP 315.

EDSP 778. Technology for Special Education. (2) II. Designed to help special educators develop an awareness of technology that can assist in the lives and learning of students receiving special education. Administrative applications of technology related to special education will also be covered. Pr.: EDETC 718.

EDSP 786. Topics in Education. (1–3) I, II, S. Examination of current topic in specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

EDSP 787. Field Experiences in Special Education. (1–3) On sufficient demand. Observation and supervised activities in schools, camps, clinics, or institutions related to student's area of special interest or preparation.

Graduate credit

EDSP 830. Assessment in Special Education. (3) I, S. A study of assessment procedures used in the preferral, identification, and instructional phases of program planning for students with special needs. Pr.: EDSP 710 and EDCEP 715.

EDSP 833. Administration of Special Education Programs. (2–3) On sufficient demand. The study of administrative units for special education, placement procedures, federal and state legislation, and program reimbursement and funding. Pr.: EDADL 818 or 811.

EDSP 841. Interventions: Moderately Mentally Retarded. (3) II. Curriculum content, methods, and organization of educational programs for children with moderate mental retardation. Pr.: EDSP 724 and EDSP 842 or EDSP 843.

EDSP 842. Interventions: Emotional and Behavioral Disorders. (3) I, S. Educational planning assessment, instructional methods, curricular modification, media and materials, teacher competencies, and model programs for students with emotional and behavioral disorders. Pr.: EDCEP 315 or EDSP 710.

EDSP 843. Interventions: Academic Disabilities. (3) II, S. Educational planning, instructional methods, and curricula modifications for students with academic learning disabilities. Pr.: EDCEP 315 or EDSP 710.

EDSP 844. Special Education in Secondary Schools. (2) S. Educational perspectives in service delivery options, educational planning, general instructional approaches, learning strategies, and adaptions and modifications of instructional materials and settings for the secondary student in special education. Pr.: EDCEP 315, EDSP 710 and EDSP 843.

EDSP 845. Special Education Programming: Parental Involvement. (2) I, S. An in-depth consideration of the role of home and parents in the educational programming for exceptional children. Emphasis on practical and positive strategies used in working with parents. Pr.: EDSP 710.

EDSP 846. Interventions: Early Childhood Special Education. (3) II. Strategies, policies, and procedures for the education of young children (0–5 years of age) with disabilities. Areas of emphasis include Individual Service Plans, interagency collaboration, and specific strategies for parents and young children. Pr.: EDSP 710.

EDSP 847. Curriculum for the Gifted. (3) On sufficient demand. Theories and strategies for differentiating the curriculum for gifted students, emphasis on appropriate methods and materials. Pr.: EDSP 750.

EDSP 848. Transitions in Special Education. (2) I, S. A study of transition models, curricula, assessment, career development, community resources and agencies, and materials. Pr.: EDSP 710.

EDSP 850. The Consulting Process in Special Education. (3) S. A course to prepare special education teachers with skills for consulting effectively with classroom teachers, related services personnel, administrators, and parents about curriculum and program alternatives for exceptional children. Emphasis is upon developing collaborative consultation processes through communication, cooperation and coordination techniques. Pr.: EDSP 323 or 324 or 500, and EDSP 750 or 842 or 843 or 847 or 848.

EDSP 885. Practicum in Education of Exceptional Individuals. (1–6) On sufficient demand. Observation and participation in teaching exceptional individuals under the supervision of selected teachers in special education programs. Pr.: EDSP 841 or EDSP 842 or EDSP 843 or EDSP 846.

EDSP 886. Seminars in Special Education. (Var.) On sufficient demand. Intensive discussion of research or problems of current professional interest based on study of pertinent original literature. Pr.: Teaching experience.

EDSP 888. Externship in Special Education. (1) I, II, S. The course provides a forum for self-directed development of competencies in Special Education. Students conduct self-assessment and develop strategies for ongoing professional development. Pr.: EDSP 885.

EDSP 898. Master's Report. (Var.) I, II, S. Pr.: Permission by department head.

EDSP 899. Master's Research. (Var.) I, II, S. Pr.: Permission by department head.

EDSP 986. Advanced Seminar in Special Education. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDSP 991. Internship in Special Education. (Var.) I, II, S. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of department head.

EDSP 999. Research in Special Education. (Var.) I, II, S. Individual investigation in the field of a student's specialization. Pr.: Sufficient training to carry on the line of research undertaken.

For more information

For additional information and application materials please contact:
Office of Graduate Studies
College of Education
Kansas State University
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/
See Education in this catalog for additional information.

Speech Communication, Theatre, and Dance

Head
David E. Procter

Directors of graduate studies
Charles J. G. Griffin, Daniel Davy

Graduate faculty
Cathy L. Anderson, M.F.A., University of Connecticut.

James L. Armagost, Ph.D., University of Washington, Seattle.

John O. Burtis, Ph.D., University of Minnesota.

Daniel L. Davy, Ph.D., University of California–Santa Barbara.

Norman J. Fedder, Ph.D., New York University.

Nancy R. Goulden, Ed.D., Northern Arizona University.

Charles J. G. Griffin, Ph.D, University of Missouri–Columbia.

Carl M. Hinrichs, M.A., University of North Carolina.

Charlotte A. MacFarland, M.A., University of Wisconsin.

Marci E. Maullar, M.F.A., Pennsylvania State University.

Dana Pinkston, M.F.A., Penn State University.

L. Kristine Pond, Ph.D., University of Iowa.

David E. Procter, Ph.D., University of Nebraska–Lincoln.

William J. Schenck-Hamlin, Ph.D., University of Oregon.

Lewis E. Shelton, Ph.D., University of Wisconsin.

Judith K. Zivanovic, Ph.D., University of Wisconsin.

The Department of Speech Communication, Theatre, and Dance offers the master of arts degree with emphases in rhetoric/communication and theatre. The requirements for each emphasis are described below.

The department offers a number of graduate teaching assistantships. Graduate assistants receive a waiver of tuition and a stipend. Most graduate assistants teach the basic speech course, but there are also assistantships available which include coaching duties in debate and forensics and teaching/construction duties in scenery and costumes. Students interested in an assistantship should submit their application by April 1 for the coming academic year.

Rhetoric/communication

The graduate program in rhetoric/communication within the department offers students a broad-based education in the theory and criticism of human communication. The objective of the program is to provide students with a program of instruction that exposes them to diverse perspectives within the field of speech communication in preparation for careers in teaching, business, law, ministry, government, and community service.

The rhetoric/communication program is housed in Nichols Hall, one of the architectural showpieces of the K-State campus. Facilities include semi-private office accommodations for graduate teaching assistants, a departmental library, seminar room, and practice facilities for debate and forensics activities. The K-State campus is ideally situated for students interested in the study of political communication because of the proximity of the Eisenhower and Truman presidential libraries.

The graduate program in rhetoric/communication has been recognized as one of the top graduate programs in speech communication in the midwest region. The graduate faculty is committed to providing every student with individual attention in the planning and conduct of his or her program of study. Classes are small, allowing faculty and students to work closely together on projects of mutual interest. Graduate students may also work with K-State's nationally recognized debate and forensics programs.

Master's degree requirements

Students become eligible for the master of arts in speech upon recommendation of the graduate faculty and completion of the following requirements:

1. SPCH 710, 720, 730, and one of the following: SPCH 733, 821, or 822. (12 credit hours total)

2. An additional 18 credit hours in rhetoric/communication courses numbered at the 600 level or above, including six credit hours of SPCH 899 (for students electing the thesis option); or an additional 20 credit hours, including 2 credit hours of SPCH 899 (for students electing the nonthesis (report) option).

3. Submission of an acceptable thesis or report.

4. Completion of an oral examination which includes a defense of the thesis or report.

In consultation with his or her advisor, a student may develop a minor emphasis of up to 6 credit hours at the 500 level or above in academic areas outside the rhetoric/communication program.

Students may elect either a thesis or nonthesis (report) program of study. A master's thesis identifies an original research problem, implements an appropriate methodology and

reports and interprets its findings. Completion of a thesis project demonstrates the student's ability to carry out sustained, independent research that makes an original contribution to the discipline. A master's report is an academic essay that reviews and analyzes research literature within the discipline. Completion of a report project demonstrates the student's ability to interpret and synthesize scholarly literature in a given subject area.

Both the master's thesis and research report options require prospectus approval by the graduate faculty and adherence to Graduate School and departmental guidelines.

Admission

Students enter the graduate program in rhetoric/communication from a variety of undergraduate majors. However, applicants should possess a strong academic record and appropriate background work in the field of speech communication. Students whose undergraduate record reflects deficiencies in either of these areas may be granted admission on a provisional basis.

Admission is based upon review of the applicant's undergraduate transcript, three letters of recommendation, statement of objectives, and writing sample (such as an undergraduate term paper). Applicants are encouraged, though not required, to take the Graduate Record Examination.

Progress through the program

Continuation in the program is contingent upon the student making satisfactory progress towards the degree. Satisfactory progress is defined as follows: (1) The student must maintain an overall grade point average of 3.0 (on a 4.0 scale). (2) The student must earn a grade of B or better in all required courses. A student who receives a grade below B in a required course must retake the course as a condition for continuation in the program. A student whose overall grade point average falls below 3.0 will be placed on probationary status. Continuation in the program will be contingent upon the student raising his or her grade point average to the minimum (3.0) within one semester.

Theatre

The department offers a master's degree with an emphasis in theatre, providing general education on an advanced level with the opportunity to specialize in a particular area—such as acting, costuming, directing, drama therapy, dramatic literature, stage lighting, playwriting, stage design, technical theatre, theatre history, or theatre management. The program prepares students for MFA or PhD study, professional training in drama therapy, teaching on the secondary or junior college level, or employment in the community or professional theatre. The theatre program is an accredited institutional member of the National Association of Schools of Theatre.

Requirements

Students are admitted on the basis of their undergraduate transcripts and three letters of recommendation. A major in theatre is expected, but students with degrees in other areas may take undergraduate courses to make up deficiencies. A 3.0 overall undergraduate average is required, but students who do not meet this requirement may be admitted on probation.

There are three categories to the degree requirements:

1. Course work (30 credits): theatre history/dramatic literature (9 credits); acting, directing, or playwriting (3 credits); technical theatre (3 credits); electives (15 credits). At least 15 credits must be in 800-level courses and 3 credits in a 700-level course.

2. Project, report, or thesis
a. Project: Demonstration of competence in a specific area of theatre. (No credit)
b. Report: Writing of a research paper for the purpose of gathering and assimilating information on a particular theatre topic. (2 credits)
c. Thesis: Writing of a lengthy research paper making an original contribution to the field of theatre study. (6 credits)

3. Oral examination on project, report, or thesis.

Facilities

The theatre program boasts three outstanding production facilities—a 250-seat thrust/arena stage, an 1,800 seat proscenium theatre, and a 100-seat student production space. This enables us to produce an extensive and varied season of plays, musicals, and operas—classic, modern, and original.

Rhetoric/communication courses

Undergraduate and graduate credit

SPCH 630. Special Topics in Rhetoric and Communication. (3) II. Intensive study of selected topics in communication and rhetoric. Repeatable with change in topic. Pr.: Junior standing and consent of instructor.

SPCH 710. Introduction to Communication Research Methods. (3) I. Introduction to descriptive and experimental methodologies in communication, including conceptualization and operationalization of communication concepts, strategies of research design, and logic of inquiry. Pr.: SPCH 320.

SPCH 720. Perspectives on Communication. (3) Analysis of current perspectives on the communication process. Materials cover assumptions, principles, implications and selected research within each perspective. Pr.: SPCH 320.

SPCH 721. Language and Social Interaction. (3) II. Study of the epistemological, social, and behavioral functions of language in communication. Examination of the processes by which language functions to construct one's worldview and guide individual action. Pr.: SPCH 320 or LING 280 or ANTH 220; junior standing.

SPCH 722. Instructional Communication. (3) II. Study of theory and practice of communication in the classroom including both teacher and student communication. Topics include: integration of modes of communication, language choices, power, humor, communication strategies for instruction, and impact of communication on learning. Same as EDCIP 722.

SPCH 725. History of American Public Address. (3) Study of American speakers, from the time of Jonathan Edwards to the present, including their education, major speeches, and contributions to the rhetorical history of the United States. Pr.: Junior standing and consent of the instructor.

SPCH 726. Seminar in Persuasion. (3) II, in odd years. Survey and analysis of advanced theory and experimental studies in persuasion. Pr.: Junior standing.

SPCH 730. Classical Rhetorical Theory. (3) Study of rhetorical theory and criticism from early Greek to Roman times. Pr.: SPCH 330 or graduate standing.

SPCH 731. Nineteenth Century Rhetorical Theory. (3) Study of the influences on and developments of rhetorical theory in nineteenth century America as manifested in eduational and public settings. Pr.: SPCH 730.

SPCH 732. Contemporary Rhetorical Theory. (3) II. Study of major European and American contributors to rhetorical theory in the twentieth century. Pr.: SPCH 730.

SPCH 733. Rhetorical Criticism. (3) II. Study of traditional and contemporary approaches to the analysis of public discourse. Pr.: SPCH 330.

SPCH 735. Leadership Communication. (3) II in alternate years. Review the literature and develop research projects regarding the communication processes by which people move from operating as individuals into groups with a sense of groupself and, further, into groups or organizations that require leadership. Pr.: SPCH 311 or 326 or 425.

SPCH 799. Problems in Speech. (Var.) Open to students in any speech area. Pr.: Junior standing and consent of instructor.

Graduate credit only

SPCH 810. Research Writing in Rhetoric/Communication. (1) A study of the problems of writing and rewriting the results of scholarly investigations in rhetoric/communication.

SPCH 820. Seminar in Rhetoric/Communication. (3) Selected topics in rhetoric/communication research. May be repeated for credit with change in topic.

SPCH 821. Experimental Research in Speech Communication. (3) I. Descriptive and experimental methodologies pertinent to investigation in rhetoric/communication. Topics will include such techniques as content analysis, attitude scaling, and stylistic analysis. Pr.: SPCH 520 or equivalent.

SPCH 822. Field Research in Speech Communication. (3) II. Critical and interpretive methodologies pertinent to investigations in rhetoric/communication. Topics will include participant observation, unstructured interviewing, ethnography, and discourse analysis. Pr.: SPCH 330 or equivalent.

SPCH 823. Competitive Forensic Theory. (3) Theory and study of current research in competitive debate and individual events. Pr.: SPCH 125 and 426.

SPCH 899. Research in Speech. (Var.) Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor.

Linguistics courses

Undergraduate and graduate credit

LING 594. Comanche Texts. (3) I, in alternate years. General introduction to Comanche grammatical and discourse systems and study of oral narratives: published and unpublished texts including coyote stories, adventure stories, personal recollections, etc. Some attention to pronunciation, but major emphasis on the development of a basic reading ability and understanding of the world portrayed in the narratives. Same as LG 594.

LING 595. Archeological Decipherment. (3) I, in alternate years. The art and science of four famous cases of decipherment Mesopotamian cuneiform Egyptian hieroglyphics, Creto-Mycenaean Linear B, and on-going work on the Maya script. Characteristics of successful decipherments and resultant increases in knowledge about the history of writing and the richness of various cultures of the past. Same as LG 595.

LING 600. Principles of Linguistics. (3) The scientific study of language, with examples from English, Spanish, French, German, and others. Overview of language origins, phonetics, phonology, syntax, semantics, language acquisitions, dialects, language change, and writing systems. Same as ENGL 600 and LG 600.

LING 601. General Phonetics. (3) I, in alternate years. Description and classification of speech sounds according to point and manner of articulation. Transcription in the International Phonetic Association Alphabet. Includes sounds of English, French, Spanish, German, and others. Same as ENGL 601 and LG 601.

LING 602. Historical Linguistics. (3) I, in alternate years. Internal and comparative reconstruction of earlier forms of languages. Genetic relationships in language families, and various typological considerations. Includes French, Spanish, and others. Same as ENGL 602 and LG 602.

LING 603. Topics in Linguistics. (1–3) I, in alternate years. Seminar on a special-topic in linguistics: decipherment of ancient writing systems, linguistics applied to the teaching of English or other languages, discourse analysis (especially of spoken texts), etc. Topic to be announced for semester in which offered. Repeatable for credit on a different topic. Same as ENGL 603 and LG 603.

LING 783. Phonology I. (3) Basic concepts of the theory of language sound systems with particular reference to English but including reference to other languages as well. Pr.: SPCH or ENGL 681 and SPCH, ENGL, or MLANG 780. Same as ENGL 783 and LG 783.

LING 785. Syntax I. (3) Basic concepts of syntactic theory, with particular reference to English but including reference to the grammatical systems of other languages as well. Pr.: ENGL 530 or SPCH, ENGL, or LG 780. Same as ENGL 785 and LG 785.

LING 792. Field Methods in Linguistics. (3) On sufficient demand. Techniques of collecting and analyzing linguistic data in the field. Work with language consultants in class, on languages such as Swahili. Pr.: Consent of the instructor. Same as LG 792 and ANTH 792.

LING 796. Theories of Grammar. (3) I. Comparative examination of the assumptions, aims, and procedures of four types of English grammar—the normative grammar of Robert Lowth, the historical grammar of Otto Jespersen, the structural grammar of Leonard Bloomfield, and the generative-transformation grammar of Noam Chomsky—and their application. Same as ENGL 796. Pr.: Junior standing, and ENGL 530 or LING 600.

Theatre courses

Undergraduate and graduate credit

THTRE 630. Topics in Theatre. (1–4) I, II, S. Selected topics in theatre may be repeated with topic change to a maximum of 12 hours credit. Pr.: Junior standing and consent of instructor.

THTRE 632. Costume Design. (3) I. Studies in the theory and practice of costume design for stage and film. Pr.: THTRE 267.

THTRE 660. Professional Theatre Tour. (2–3) Intersession, S. Supervised viewing and analysis of professional theatre productions. Travel to one or more theatre centers such as New York, London, or Los Angeles. Students are charged an additional fee to cover travel expenses. Written critical reviews of the productions are required. May be repeated once by undergraduates. Pr.: Six hours of credit in theatre.

THTRE 661. Professional Development. (1) I. Study of audition techniques including supervised preparation of appropriate material. Business aspects of professional theatre, including unions, contracts, and professional ethics. Pr.: 12 hours in theatre, music, and/or dance.

THTRE 664. Creative Dramatics. (3) The development of creative imagination and personal well-being through theatre games, improvisation, role playing, and simulation. The use of drama in recreational and educational settings. Improvisation in performing scripted drama. Pr.: Junior standing.

THTRE 665. Drama Therapy with Special Populations. (3) The therapeutic uses of drama in the development of creative imagination, self expression, and social relatedness with special populations such as the mentally disabled, the emotionally disturbed, and the senior adult. Pr.: Junior standing.

THTRE 666. Stage Management. (3) I, II. Theory and practice of stage management in the professional and nonprofessional theatre. Emphasis is on the organization of all areas of theatre knowledge needed for the running of theatrical productions. Pr.: THTRE 368.

THTRE 667. Period Styles for the Theatre 1. (3) II. Survey of historical styles of architecture, furnishings, and clothing in relation to theatrical design and the history of the theatre from the Greeks to 1800. Pr.: THTRE 572 or concurrent enrollment.

THTRE 668. Period Styles for the Theatre 2. (3) I. Survey of historical styles of architecture, furnishings, and clothing in relation to theatrical design and the history of the theatre from 1800 to present. Pr.: THTRE 573 or concurrent enrollment.

THTRE 671. History of Opera. (3) A study of selected masterpieces of musical drama, with emphasis on the relationship of music and drama, and on the unique qualities of opera as a collective artwork. Pr.: MUSIC 201 or MUSIC 250 or THTRE 370. Same as Music 650.

THTRE 672. American Ethnic Theatre. (3) Drama and stagecraft of ethnic groups in the United States, including the theatre of African, Asian, Hispanic, Jewish, and Native Americans. Pr.: Junior standing.

THTRE 710. Practicum in Theatre. (0–6) Supervised participation in a position of major responsibility. May be repeated for a maximum of 12 hours credit. Pr.: THTRE 160 or 261 or 368; junior standing; consent of supervising faculty member and approval of faculty members are required.

THTRE 711. Topics in Technical Theatre. (3) Selected topics in creative techniques and investigation for technical theatre. May be repeated for credit with change in topic. Pr.: THTRE 368 and consent of instructor.

THTRE 712. Theatre Management. (3) Theatre management, promotion, finance, organization; emphasis on contract negotiations and use of facilities.

THTRE 760. Principles of Drama Therapy. (3) Study of theory and practice in the use of Drama as therapy, including assessment and treatment, individual and group practice, and Psychodrama. Pr.: THTRE 664 or 665.

THTRE 761. Advanced Acting. (3) Studies in style, technique, and characterization. May be repeated once. Pr.: THTRE 361 and consent of instructor.

THTRE 762. Advanced Playwriting. (3) Further study in the writing of drama; emphasis on problems of writing full-length plays. May be repeated for a total of 9 hours credit by qualified students. Pr.: Consent of instructor. Same as ENGL 762.

THTRE 763. Reader's Theatre. (3) The nature, purpose, and production of oral interpretation of literature in the theatre; emphasis on monologue, lecture-recital, and play reading. May be repeated for a total of 6 hours credit by qualified students. Pr.: Consent of instructor.

THTRE 764. Early American Theatre. (3) Studies in the drama and stagecraft of the colonies and the United States from the beginnings to 1900. Pr.: Junior standing.

THTRE 765. Practice in Directing. (3) A lec.-lab course with emphasis on directing dramatic productions under performance conditions. May be repeated for a total of 9 hours credit by qualified students. Pr.: Consent of instructor.

THTRE 777. Aesthetics of the Theatre. (3) Principal emphasis on theoretical problems of dramatic art.

THTRE 779. Repertory Theatre. (3) Concentrated studies in theory and practice of repertory theatre productions. Reading, demonstrations, study of play scripts; play selection and production methods; operation of and assistance in production of plays in repertory. May be repeated for a total of 12 hours credit by qualified students. Pr.: Consent of instructor.

THTRE 780. Theatrical Design Studio. (0–3) I, II. Advanced problems in conceptualization and realization of design, including sets, costumes, lights and technical production. Emphasis on advanced techniques in research, analysis, and production problems. May be repeated to a maximum of 6 credits. Pr.: THTRE 567, 568, 579, or 569.

THTRE 782. Women in Theatre. (3) A history of the contributions made by women in theatre as playwrights, managers, directors, and performers; contemporary women in theatre and their experiments in expressing women's consciousness.

THTRE 783. Practice in Acting. (3) Advanced studies in characterization with emphasis on communicating with the director. Taught in conjunction with the Practice in Directing workshop. May be repeated once. Pr.: THTRE 361 and consent of instructor.

THTRE 784. Psychodrama. (3) Theory and practice of Psychodrama as a treatment modality for use in Drama Therapy.

THTRE 785. Sociodrama. (3) Theory and practice of Sociodrama as a therapeutic and educational modality for use in Drama Therapy.

THTRE 786. Israeli Theatre. (3) Drama and stagecraft of Israeli Theatre from its origins through the present. Pr.: Junior standing.

THTRE 799. Projects in Theatre. (1–4) I, II. Individual guided work in selected area. Only 3 hours may be applied to MA. Pr.: Junior standing and consent of instructor.

Graduate credit

THTRE 862. Workshop in Playwriting. (3) Advanced writing of drama. May be repeated once for credit. Same as ENGL 862. Pr.: THTRE 762 (or ENGL 762) or proof of equiv. proficiency.

THRE 870. Greek and Roman Theatre. (3) Studies in the drama and stagecraft of the Greek and Roman period. Pr.: THTRE 572.

THTRE 871. Medieval and Baroque Theatre. (3) Studies in the drama and stagecraft of the Medieval and Baroque periods. Pr.: THTRE 572.

THTRE 875. Contemporary Theatre. (3) Studies in drama and stagecraft since 1968. Pr.: THTRE 573.

THTRE 876. Seminar in Theatre. (3) Selected topics in theatre research. May be repeated for credit with change of topic. Pr.: THTRE 572 or 573.

THTRE 878. History of the Physical Stage. (3) A survey course in the emergence and development of the theatre building as a distinct architectural form, with particular emphasis on the effect of the physical environment on the play. Pr.: THTRE 368.

THTRE 879. Modern Theatre. (3) II, in even years. Studies in the drama and stagecraft of Europe and America in the period from 1870 to the present. Pr.: THTRE 573.

Dance courses

Undergraduate and graduate credit in minor field

DANCE 502. Performance Production. (1–2) I, II. Studies in the techniques of dance production and performance. Emphasis is on practical application. May be repeated four times. Pr.: Junior standing or consent of instructor.

DANCE 504. Performance Aesthetics. (3) On sufficient demand. Examination of performance as art. Analysis of general aesthetic theory to performance through such issues as style, content, form, gender, and role. Oral and written experience in planning, executing, and assessing performance events. Pr.: Junior standing or consent of instructor.

DANCE 505. Methods and Materials of Teaching Dance. (2) On sufficient demand. An in-depth survey of the development of dance education and a practical examination of dance for its educative, artistic, disciplinary, and therapeutic values. Emphasis on role of dance education, pedagogy, and advocacy. Pr.: DANCE 205, 405, and 504 or consent of instructor.

DANCE 506. Dance Education Fieldwork. (1) On sufficient demand. A semester of supervised fieldwork incorporating dance as an educative tool in the classroom, in a therapeutic setting, or in an advocacy position. Application of dance education theory under faculty supervision and conference. Pr.: DANCE 505.

DANCE 510. Senior Project. (1) Student creates and presents major performance, choreographic or written project demonstrating advanced level of achievement. Pr.: Senior standing and consent of instructor.

DANCE 520. Principles of Dance Technology. (3) On sufficient demand. Examination and application of video and computer technology to dance. Includes instruction and use in performance, choreography, education and research. Emphasis on conceptual framework. Pr.: Senior standing.

DANCE 599. Independent Studies in Dance. (1–3) Selected topics in dance. Maximum of 3 hours applicable toward degree. Pr.: Consent of department head.

DANCE 690. Senior Honors Thesis. Open only to seniors in the arts and sciences honors program.

For more information

For additional information and application materials please contact:
Director of Graduate Studies
Department of Speech Communication, Theatre, and Dance
Kansas State University
129 Nichols Hall
Manhattan, KS 66506–2301
785-532-6875
Home page: http://www.ksu.edu/sctd/

Statistics

Head
Dallas E. Johnson

Director of graduate studies
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Graduate faculty
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James Higgins, Ph.D., University of Missouri-Columbia.
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Kenneth Kemp, Ph.D., Michigan State University.
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George Milliken, Ph.D., Colorado State University.
James Neill, Ph.D., Kansas State University.
Paul Nelson, Ph.D., Rutgers University.
Jeffrey Pontius, Ph.D., University of Wyoming.
Deborah Rumsey-Johnson, Ph.D., Ohio State University.
Winston Yang, Ph.D., Iowa State University.

Careers

To solve problems we need information. But, what kind? How much? And after we get it, what do we do with it? Statisticians deal with numerical information usually called data. Their job is to match the data with the problem, and to figure out what to collect and how to make the numbers manageable so that other people can understand them. All areas that involve the collection and analysis of data can benefit from the skills of a statistician. Monitoring the environment, developing new vaccines, making more reliable products, growing crops more efficiently, and setting insurance rates are just some endeavors in which statisticians have had a significant impact. Statistics is a field in which experts have virtually unlimited opportunities.

Perhaps the most recognizable careers in statistics are those in the state and federal governments. Professionals are not only hired into such areas as the Bureau of Labor Statistics and the Bureau of the Census, but are in demand in many service agencies.

Universities hire statisticians in many academic departments, including mathematics, management sciences, economics, genetics, history, and psychology, and at the administrative and service levels, including business affairs, research support, and personnel.

Private industry is a heavy user of the skills of the statistician. For example, the pharmaceutical industry employs many statisticians to design studies and analyze data to show the safety and effectiveness of new drug compounds. Manufacturing industries are increasingly using statisticians to help them improve quality and productivity. Private consulting can be lucrative for the experienced statistician who works with both private industry and government. Companies of all sizes employ staff statisticians to keep the business progressing and competitive.

Preparation

The Department of Statistics accepts students from many different disciplines. Students entering the M.S. program should have a background of calculus, matrix algebra, computer programming, and introductory statistics. Students entering the Ph.D. program should have additional course work in statistics and mathematics.

Programs

The Department of Statistics offers studies leading to a master of science or a doctor of philosophy degree. A master's degree is recommended for a career in industry or government. The Ph.D. degree is usually required for post-secondary teaching and higher level positions. The department offers concentration in applied and mathematical probability and statistics.

Master's degree

The most common option for the M.S. degree is the report option. Students take 30 hours of course work and write a report for 2 additional credit hours. There is great flexibility in the topic the student may choose for a report. It may be an investigation of some property of a statistical procedure, a review of literature, an application of an existing method to some real-world problem, or other topic approved by the student's major professor. Other options are the thesis option and the 36 hour course option. Your choice should be made in consultation with your major professor. All M.S. students must take STAT 770, STAT 771, STAT 850, STAT 860, and either STAT 851 or STAT 861.

Ph.D. degree

Students are required to have 90 credit hours. A typical program consists of 30 hours from the master's program, 30 hours of additional course work and 30 hours of research. Students are required to pass a qualifying exam, which is given in January and August each year. The qualifying exam consists of material from STAT 720, STAT 770, STAT 771, STAT 860, and STAT 861. It will test your knowledge of basic methods and introductory theory. Students who fail the exam may, upon recommendation of the faculty, be allowed to take it a second time, but approval of a second opportunity is not automatic.

Upon completion of course work, normally in the third year of Ph.D. study, students who have passed the qualifying exam must take a preliminary exam. This exam is required by the university and is intended to test the student's breadth and depth of knowledge in the chosen field of study. The exam is prepared in consultation with the student's major professor and advisory committee. It consists of two parts: (1) a statistical foundations exam; (2) an integrated topics exam over the student's area of specialization. Students are also required to present a seminar on a topic approved by the major professor and advisory committee in which the student is to demonstrate an ability to read and communicate information in the research literature.

Consulting opportunities

The department does a tremendous amount of consulting work for researchers and students on campus and for individuals and agencies off campus. Projects vary in length of time and sophistication of methods needed to complete them. Students may contact the department head to find out what is available. Those who wish to do consulting will be assigned a faculty member to direct the work. At the student's discretion, up to 2 hours credit may be earned for consulting by registering for STAT 945.

Statistics courses

Undergraduate and graduate credit in minor field

STAT 510. Introductory Probability and Statistics I. (3) I, II. Descriptive statistics, probability concepts and laws, sample spaces; random variables; binomial, uniform, normal, and Poisson; two-dimensional variates; expected values; confidence intervals; binomial parameter, median, mean, and variance; testing simple hypotheses using CIs and X^2; goodness of fit. Numerous applications. Pr.: MATH 222.

STAT 511. Introductory Probability and Statistics II. (3) I, II. Law of Large Numbers, Chebycheff's Inequality; continuation of study of continuous variates; uniform, exponential, gamma, and beta distribution; Central Limit Theorem; distributions from normal sampling; introduction to statistical inference. Pr.: STAT 510.

Undergraduate and graduate credit

STAT 702. Statistical Methods for Social Sciences. (3) I, II. Statistical methods applied to experimental and survey data from social sciences; test of hypotheses concerning treatment means; linear regression; product-moment, rank, and bi-serial correlations; contingency tables and chi-square tests. Pr.: MATH 100.

STAT 703. Statistical Methods for Natural Scientists. (3) I, II, S. Statistical concepts and methods basic to experimental research in the natural sciences; hypothetical populations; estimation of parameters; confidence intervals; parametric and nonparametric tests of hypotheses; linear regression; correlation; one-way analysis of variance; t-test; chi-square test. Pr.: Junior standing and equiv. of college algebra.

STAT 704. Analysis of Variance. (2) I, II, S. Computation and interpretation for two- and three-way analyses of variance; multiple comparisons; applications including use of computers. Meets four times a week during first half of semester. Pr.: One previous statistics course.

STAT 705. Regression and Correlation Analyses. (2) I, II, S. Multiple regression and correlation concepts and methods; curvilinear regression; applications including use of computers. Meets four times a week during second half of semester. Pr.: One previous statistics course.

STAT 706. Basic Elements of Statistical Theory. (3) I. The mathematical representation of frequency distributions, their properties, and the theory of estimation and hypothesis testing. Elementary mathematical functions are used to illustrate theory. Pr.: MATH 205, 210 or 220 and STAT 320.

STAT 710. Sample Survey Methods. (2) II, in even years. Design, conduct, and interpretation of sample surveys. Pr.: STAT 702 or 703. Meets four times a week during first half of semester.

STAT 713. Applied Linear Statistical Models. (3) I. Matrix-based regression and analysis of variance procedures at a mathematical level appropriate for a first-year graduate statistics major. Topics include simple linear regression, linear models in matrix form, multiple linear regression, model building and diagnostics, analysis of covariance, multiple comparison methods, contrasts, multi-factor studies, blocking, subsampling, and split-plot designs. Pr.: Prior knowledge of matrix or linear algebra and a prior course in statistics. A student may not receive credit for both the STAT 704/705 sequence and STAT 713.

STAT 716. Nonparametric Statistics. (2) I, in odd years. Hypothesis testing when form of population sampled is unknown: rank, sign, chi-square, and slippage tests; Kolmogorov and Smirnov type tests; confidence intervals and bands. Meets four times a week during second half of semester. Pr.: One previous course in statistics.

STAT 717. Categorical Data Analysis. (3) II. Analysis of categorical data arranged in two and higher dimensional contingency tables using classical methods and log linear models. Various measures of association are discussed. Pr.: STAT 704, 705

STAT 720. Design of Experiments. (3) I, S. Planning experiments so as to minimize error variance and avoid bias; Latin squares; split-plot designs; switch-back or reversal designs; incomplete block designs; efficiency. Pr.: STAT 704 and 705.

STAT 722. Statistical Designs for Product Development and Process Improvement. II. A study of statistically designed experiments which have proven useful in product development and process improvement. Topics include randomization, blocking, factorial treatment structures, fractional factorial designs, screening designs, Taguchi methods, response surface methods. Pr.: STAT 511 or STAT 704 and 705.

STAT 725. Digital Statistical Analysis. (3) II. Techniques of programming in algorithmic languages for statistical applications. Topics include efficiency and numerical accuracy of algorithms, random number generation, Monte Carlo methods, techniques of simulation, and some basic principles of numerical analysis. Pr.: CIS 200 or equiv., STAT 704 and 705.

STAT 730. Multivariate Statistical Methods. (3) I. Multivariate analysis of variance and covariance; classification and discrimination; principal components and introductory factor analysis; canonical correlation; digital computing procedures applied to data from natural and social sciences. Pr.: STAT 704, 705.

STAT 735. Statistics in Health Related Industries. (2) I, in odd years. Case studies and selected literature of applications of statistics to problems in the pharmaceutical and health-related industries are discussed. Topics include pharmacokinetic analysis, covariance analysis, crossover studies, bioequivalence. Meets four times a week during first half of semester. Pr.: STAT 704, 705, 720.

STAT 736. Bioassay. (2) I, in odd years. Direct assays; quantitative dose-response models; parallel line assays; slope ratio assays; experimental designs for bioassay; covariance adjustment; weighted estimates; assays based on quantal responses. Meets four times a week during second half of semester. Pr.: STAT 704, 705.

STAT 740. Nonlinear Models. (3) S, in even years. Methods of estimating parameters of nonlinear models; procedures for testing hypotheses; construction of confidence intervals and regions; nonlinear analysis of covariance; quantal dose response and probabilistic choice models. Pr.: MATH 222, STAT 720.

STAT 745. Graphical Methods, Smoothing, and Regression Analysis. (3). II, in even years. Visual display of quantitative information. Graphical techniques to portray distributions of data, multivariate information, means comparisons, and assessment of distributional assumptions. Data smoothing techniques including loess, parametric, robust, and nonparametric regression, and generalized additive models. Graphical evaluation of smoothing techniques including assessment of assumptions. Regression diagnostics. Pr.: STAT 705

STAT 770. Theory of Statistics I. (3) I. Probability models, concepts of probability, random discrete variables, moments and moment generating functions, bivariate distributions, continuous random variables, sampling. Central Limit Theorem, characteristic functions. More emphasis on rigor and proofs than in STAT 510 and 511. Pr.: MATH 222.

STAT 771. Theory of Statistics II. (3) II. Introduction to multivariate distributions; sampling distributions, derivation, and use; estimation of parameters, testing hypothesis; multiple regression and correlation; simple experimental designs; introduction to nonparametric statistics; discrimination. Pr.: STAT 770.

STAT 799. Topics in Statistics. (Var.) I, II, S. Pr.: STAT 703 or 770 and consent of instructor.

STAT 807. Applied Geostatistics. (2) Spring Intersession, in odd years. Analysis of spatially-correlated data. Univariate, bivariate, and spatial description; global and point estimation; random function models; stationarity; intrinsic hypothesis; semivariogram; correlogram; ordinary and block kriging, cross validatiion; cross correlation and cokriging; experimental design. One hour lec. and one hour computer lab a day. Pr.: STAT 510 or STAT 703. Cross-listed with CE 807, ASI 807.

STAT 810. Seminar in Probability and Statistics. (1) I, II. Discussion and lectures on topics in probability and statistics; one seminar talk by each student registered for credit. Pr.: Graduate standing and at least two graduate courses in statistics.

STAT 818. Theory of Life-Data Analysis. (3) II, in odd years. A study of models and inferential procedures important to life-data analysis. Comparison of estimators (MLE, BLUE, etc.). Pivotal quantities. Design and regression models for non-normal distributions. Analysis of censored data. Pr.: STAT 771.

STAT 839. Probability and Asymptotic Theory I. (3) I, in even years. Probability spaces and random variables; distribution functions; moments and inequalitites; characteristic functions; stochastic independence; convergence of a sequence of distribution functions; the four types of convergence; convergence of the sum of independent random variables; laws of large number; central limit theorems; conditional expections. Pr.: STAT 771 and MATH 633.

STAT 840. Probability and Approximation Theory II. (3) II. Central limit theorems, delta method, symptotic properties of least square estimators, maximum likelihood estimators, likelihood ratio tests, sample moments, order statistics, sample quantiles, empirical distribution function, U-statistics, linear rank statistics, L-statistics. Pr.: STAT 839.

STAT 850. Stochastic Processes I. (3) II. Generating functions; conditional probability and conditional expectations; normal processes and covariance stationary processes; Poisson processes; renewal processes; Markov chains, discrete time. Pr.: STAT 770.

STAT 851. Stochastic Processes II. (3) I. Markov chains, discrete time; Markov chains continuous time; birth-death processes; Kolmogorov differential equations; diffusion processes, foward and backward Kolmogorov equations; applications. Pr.: STAT 850.

STAT 860. Linear Models I. (3) I. Subspaces, projections, and generalized inverses; multivariate normal distribution, distribution of quadratic forms; optimal estimation and hypothesis testing procedures for the general linear model; application to regression models, correlation model. Pr.: STAT 704, 705, 771; course in matrices.

STAT 861. Linear Models II. (3) II. Continued application of optimal inference procedures for the general linear model to multifactor analysis of variance, experimental design models, analysis of covariance, split-plot models, repeated measures models, mixed models, and variance component models; multiple comparison procedures. Pr.: STAT 860.

STAT 870. Analysis of Messy Data. (3) II. Design structures; treatment structures; equal and unequal variances; multiple comparisons; unequal subclass numbers; missing cells; interpretation of interaction; variance components; mixed models; split-plot and repeated measures; analysis of covariance; cross-over designs. Pr.: STAT 720.

STAT 880. Time Series Analysis. (3) I, in odd years. Autocorrelation function; spectral density; autoregressive integrated moving average processes; seasonal time series; transfer function model; intervention analysis; regression model with time series error. Pr.: STAT 705 and 770.

STAT 898. Master's Report. (2) I, II, S. Pr.: Consent of instructor.

STAT 899. Master's Thesis Research. (Var.) I, II, S. Pr.: Consent of instructor.

STAT 916. Nonparametric Theory and Rohustness. (3) I, in even years. Hodges-Lehman estimators; L-estimator; M-estimator; distribution-free confidence, prediction, and tolerance intervals; jackknife and bootstrap methods; U-statistics; linear rank statistics; two-sample problems; Pitman's asymptotic relative efficiency; k-sample problems; testing independence; simple regression problem. Pr.: STAT 840.

STAT 920. Experimental Design Theory. (3) II, in odd years. Incomplete block designs; theory of the construction and analysis of experimental designs. Pr.: STAT 720 and 861.

STAT 925. Computational Statistics. (3) I, in odd years. Seminumerical and numerical methods used in computational statistics. Application areas include linear and nonlinear least squares methods, unconstrained and constrained nonlinear function optimization, robust estimation, and classical multivariate analysis. Emphasis on the most recent advances in these and other areas supported by computational statistics. Pr.: STAT 725 and 861.

STAT 930. Theory of Multivariate Analysis. (3) II, in even years. The multivariate normal distribution, the Wishart distribution, Jacobians of vector and matrix transformations, Hotelling's T2-statistic, the union-intersection principle, tests on mean vectors and covariance matrices, Box's approximations to critical points, the multivariate general linear model, discriminant analysis, and principal component analysis. Pr.: STAT 730 and 861.

STAT 945. Problems in Statistical Consulting. (Var.) I, II, S. Principles and practices of statistical consulting. Supervised experience in consultation and consequent research concerning applied statistics and probability associated with on-campus investigations. Pr.: STAT 704, 705, and 771.

STAT 950. Advanced Studies in Probability and Statistics. (Var.) I, II, S. Theoretical studies of advanced topics in probability, decision theory, Markov processes, experimental design, stochastic processes, or advanced topics. May be repeated. Pr.: STAT 771.

STAT 995. Advanced Inference I. (3) I. Statistical decision rules; utility, loss, and risk functions; Bayes and minimax analyses; admissibility, complete classes; sufficiency, completeness, unbiased estimation; equivariance, location-scale families; maximum likelihood estimation; information inequality. Pr.: STAT 771, 840.

STAT 996. Advanced Inference II. (3) II. Neyman-Pearson lemma, monotone likelihood ratio, uniformly most powerful tests; confidence bounds; unbiasedness and invariance for hypothesis testing; sequential probability ratio tests. Pr.: STAT 995.

STAT 999. Research in Statistics. (Var.) I, II, S. Pr.: Consent of instructor.

For more information

For additional information and application materials please contact:
Department of Statistics
Kansas State University
101 Dickens Hall
Manhattan, KS 66506–0802
Phone: 785-532-6883
Fax: 785-532-7736
E-mail: head@stat.ksu.edu
Home page: http://www.ksu.edu/stats/

Student Counseling and Personnel Services

Chair
Michael Dannells

Graduate faculty
Stephen Benton, Ph.D., University of Nebraska.
Fred Bradley, Ph.D., University of Wyoming.
William Cashin, Ph.D., Catholic University.
Michael Dannells, Ph.D., University of Iowa.
Peggy Dettmer, Ph.D., Kansas State University.
Gerald S. Hanna, Ed.D., University of Southern California.
Michael C. Holen, Ph.D., University of Oregon.
Kenneth Hoyt, Ph.D., University of Minnesota.
Judith Hughey, Ed.D., University of Missouri.
Kenneth Hughey, Ph.D., University of Missouri.
Michael Lynch, Ed.D., Indiana University.
Robert Newhouse, Ph.D., University of Oregon.
Fred Newton, Ph.D., University of Missouri.
John Robertson, Ph.D., University of California, Santa Barbara.
Charles J. Werring, Ed.D., University of Georgia.
Doris Wright, Ph.D., University of Nebraska

Programs

The Department of Counseling and Educational Psychology offers the M.S. in student counseling/personnel services (with emphases in college student personnel work and school counseling), the Ph.D. in student counseling/personnel services) with emphases in counselor education and student affairs in higher education, the Ed.D. in student counseling/personnel services (with emphasis in school counseling), and the Ed.D. in educational psychology.

Admission requirements

See Education in this catalog for information about application forms, general admission requirements, and specific admission requirements for the master's and doctoral degrees.

Master's degree in college student personnel work

This emphasis is designed to prepare the student for work in a college setting at one or many different student affairs agencies and to assist the student to meet the professional entry-level and advancement requirements in the field. A minimum of 39 graduate credit hours are required in the program.

Students complete 24 hours of core courses and also select one of two options.

• The *counseling option* is most appropriate for those intending primarily to provide developmental counseling/advising services within a college or university.

• The *administration option* is more appropriate for those intending to work as student services/programs administrators. Each program of study is developed jointly by the student and advisor.

Core requirements (24 hours)

EDCEP 812	History and Philosophy of Higher Education
EDCEP 816	Research Methods
EDCEP 817	Statistical Methods in Education
EDCEP 818	Principles of College Student Personnel Services
EDCEP 823	Counseling Theory
EDCEP 838	The College Student and The College Environment
EDCEP 858	Group Processes
EDCEP 863	Trends in Career Development

Options (Select one)

A. Counseling option (15 hours)

EDCEP 715	Principles of Assessment
EDCEP 815	Using Tests in Counseling
EDCEP 877	Practicum in Counseling
EDCEP 887	Counseling Internship (two semesters)

B. Administration option (15 hours)

EDCEP 819	Survey Research
EDCEP 875	Administration of College Student Personnel Services
EDCEP 885	Practicum in College Student Personnel Work (two semesters)

An elective

Master's degree in school counseling

Students who complete the M.S. degree in school counseling 48-hour program will have K–12 endorsement. Full endorsement requires two years teaching experience. If students have taught only one year, they must complete a one-year supervised field experience. Indviduals seeking vocational education counseling endorsement must also document 4,000 clock hours of nonteaching experience.

The program's conceptual framework emphasizes development of knowledgeable, caring, ethical decision-makers within the context of groups and institutions, client development and learning, guidance and counseling of students leading to theory-driven and research-guided practice in school counseling. Curricular experiences include human growth and development, appraisal, research and program evaluation, professional orientation, and foundations.

1. Core requirements (27 hours)

EDCEP 822	Principles of Guidance (3) (S)
EDCEP 823	Counseling Theory (3) (I, S)
EDCEP 852	Career Development for School Counselors (3) (I, S)
EDCEP 856	Guidance in the Elementary School (3) (II)
EDCEP 857	Guidance Program Management (3) (II)
EDCEP 871	Consultation for Counseling (3) (S)
EDCEP 951	Multicultural Counseling (3) (S)
PSYCH 505	Abnormal Psychology (3) (I, II, S)
FSHS 810	Child Development (3) (I, II)

2. Research and appraisal requirements (9 hrs.)

EDCEP 715	Principles of Assessment (3) (I, II, S)
EDCEP 815	Using Test in Counseling (3) (II)
EDCEP 816	Research Methods (3) (I ,II, S)

3. Clinical requirements (12 hrs)

EDCEP 858	Group Processes (3) (I, S)
EDCEP 877	Practicum in Counseling (3) (I, II, S)
EDCEP 887	Counseling Internship (6) (I, II) *

The internship will consist of 600 clock hours under weekly supervision of a certified school counselor and faculty professor. The student will attend class for froup supervision and provide 240 clock hours of direct service in the school setting. Included activities are individual counseling, group work, developmental classroom guidance, and consultation.
* May be offered in variable units.

Practicum and internship arrangements are made by the coordinating faculty member when required course work has been completed and only after submission and approval of a pre-enrollment application, available in 369 Bluemont Hall. Both the coordinating faculty member and the student's committee must approve enrollment. Enrollment forms are due mid-semester for the following semester.

4. Vocational education counseling option (9 hrs.)
In addition to the above degree program, students who wish this endorsement shall take the following classes:

EDSEC 620	Principles and Philosophy of Vocational Education (3) (S)
EDSEC 701	Admisistration and Supervision of Vocational Education (3) (S)
EDSEC 713	Occupational Analysis (3) (S)

Note: I = fall, II = spring, S = summer

Doctor of philosophy in counselor education and supervision

The Ph.D. in counselor education and supervision requires 48 hours of course work plus research culminating in a dissertation that is a unique contribution to the field. The research will include a three-hour seminar in couseling research and may include up to 12 hours of research laboratory work. Training extends beyond that found in the entry-level, basic master's program. The doctoral program addresses the professional leadership roles in counselor education, supervision, advanced counseling practice, and research competencies.

1. Professional courses (15–21 hrs)

EDCEP 912	Psychological Bases of Educational Thought and Practice (3) (I,S)
	or
EDCEP 999	Research: Supervised Teaching Laboratory (3) (I, II, S)

EDCIP 943	Principles of College Teaching (3) (I, II)
EDCEP 924	Theories of Vocational Counseling (3) (on sufficient demand)
EDCEP 955	Professional Counseling Ethics (3) (I)
EDCEP 958	Advanced Group Counseling (3) (II)
EDCEP 985	Advanced Counseling Theory (3) (I)
EDCEP 967	Advanced Counseling Appraisal (3) (II)
	or
EDCEP 999	Research: Clinical Appraisal Laboratory (3) (I, II, S)

2. Cognate area (12 hrs)
Students will develop an area of professional expertise constructed of courses outside of the department planned with concurrence of the committee.

3. Practicum/internship (3–9 hrs)

EDCEP 977	Advanced Practicum (3) (I, II)
EDCEP 991	Internship in CEP (6) (I, II) *
	or
EDCEP 999	Research: Clinical Internship Laboratory (6) * (I, II, S)

The doctoral-level internship consists of 600 clock hours including supervised experiences in clinical settings, research, teaching, and supervision. The internship includes activities that are typical for a regular employed professional in the setting.

In both the practicum and internship, students receive one hour per week of individual supervision or two hours of small group supervision by qualified professionals.

* Note: These courses are variable credit.

Practicum and internship arrangements are made by the coordinating faculty member when coursework had been completed and only after submission and approval of a pre-enrollment application, available in 369 Bluemont Hall. Both the coordinating faculty member and the student's committee must approve enrollment. Enrollment forms are due mid-semester for the following semester.

4. Research courses (6 hrs)

EDCEP 817	Statistical Methods in Education (3) (I, II, S)
EDCEP 917	Experimental Design in Education Research (3) (II)
EDADL 886	Seminar: Qualitative Research (3) (on sufficient demand)
FSHS 893	Program Evaluation in Human Services (3) (II)
EDCEP 819	Survey Research (3) (I)

5. Research (30 hrs)

EDCEP 999	Research: Counseling Research Laboratory (3) (I, II, S)
EDCEP 999	Research (27) (I, II, S)

Doctor of philosophy in student affairs in higher education

Requirements unique to the Ph.D. in student affairs in higher education fall into the following areas. Students complete all core requirements and then select one specialization (either student development specialist or student affairs administration).

All courses are 3 credit hours unless noted otherwise. Each program of study is determined individually in consultation with the student's major professor (advisor) and in light of the availability of, and demand for, courses. These lists are neither exhaustive nor exclusive. Substitutions for core and option requirements may be made on an individual basis, depending upon the student's prior preparation and career goals.

1. Professional courses (30 hours)
Regardless of specialization selected (see below), all doctoral students in the student affairs in higher education program are expected to complete a common core of professional and research courses:

EDCEP 715	Principles of Assessment
EDCEP 812	History and Philosophy of Higher Education
EDCEP 818	Principles of College Student Personnel Services
EDCEP 823	Counseling Theory
EDCEP 838	The College Student and the College Environment
EDCEP 858	Group Processes
EDCEP 863	Trends in Career Development
EDCEP 875	Administration of Student Personnel Services
EDCEP 912	Psychological Bases for Educational Thought and Practice
EDCEP 948	Advanced Student Development Theory in College Student Affairs

2. Specialization (select one of the two options, A or B)
A. Student development specialist course work (24 hours)

EDCEP 815	Using Tests in Counseling
EDCEP 877	Practicum in Counseling
EDCEP 887	Counseling Internship
EDCEP 915	Theory of Measurement
EDCEP 955	Professional Counseling Ethics (3 hours)
EDCEP 958	Advanced Group Counseling
EDCEP 987	Counseling Supervision Practicum

B. Student affairs administration course work (24 hours)

EDCEP 819	Survey Research
EDCEP 825	Social Psychology of Education
EDCEP 885	Practicum in College Student Personnel Work
	or
EDCEP 991	Internship/Student Personnel
EDCEP 927	Higher Education Administration
EDCEP 986	Advanced Seminar/Institutional Research in Higher Education
EDADL 886	Seminar/Higher Education Law
EDADL 886	Seminar/Higher Education Finance
EDADL 886	Seminar/Enrollment Management

3. Outside area of study (9–12 hours)
This is developed with major professor.

4. Research courses (9 hours)

EDCEP 816	Research Methods
EDCEP 817	Statistical Methods in Education
EDCEP 917	Experimental Design in Educational Research

(Note: A course in qualitative research methods is often advisable in addition to these three research courses.)

5. Dissertation research (30 hours)
EDCEP 999 Doctoral Research (30 hours)

Residency

An academic residency is required and is satisfied with 24 hours of course work completed within 12 calendar months.

Preliminary examination

Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study.

Doctor of education degrees

The Department of Counseling and Educational Psychology offers two Ed.D. degrees: one in student counseling/personnel services (including an emphasis in school counseling) and another in educational psychology.

Ed.D. in student counseling/personnel services (including an emphasis in school counseling)

A minimum of 94 semesters hours beyond the baccalaureate degree is required. Up to 30 relevant graduate hours earned as part of a master's degree may be used to satisfy these requirements. Guidelines for the plan of study follow.

1. Area of emphasis (48 hours minimum)
The following courses or their equivalent (as determined by the supervisory committee) will normally be required as a part of the area of emphasis in the Ed.D. program in school counseling.

EDCEP 715	Principles of Assessment
EDCEP 815	Using Tests in Counseling
EDCEP 823	Counseling Theory
EDCEP 852	Career Development for School Counselors
EDCEP 857	Guidance Program Management
EDCEP 858	Group Processes
EDCEP 877	Practicum in Counseling
EDCEP 856	Guidance in the Elementary School
EDCEP 822	Principles of Guidance
EDCEP 887	Counseling Internship

The following list of courses is strongly suggested for the area of emphasis:

EDCEP 863	Trends in Career Development
EDCEP 871	Consultation for Counselors
EDCEP 985	Advanced Counseling Theory
EDCEP 986	Advanced Counseling Practicum
EDCEP 987	Counseling Supervision Practicum

2. Foundations (12 hours)
The foundations area is intended to provide the student with a broad based background in the rudimentary foundations of educational thought. Each of the following courses or their equivalent must be completed.

EDCEP 816	Research Methods
EDCEP 912	Psychological Basis of Education Thought and Practice
EDCIP 910	Multicultural Curriculum Programming
EDADL 886	Seminar: Historical and Philosophical Analysis of Education

3. Research (6 hours)
The selection of courses should be made on the basis of the research to be addressed through the dissertation.

EDCEP 817 Statistical Methods in Education
(Plus one of the following courses must be completed)

EDCEP 819	Survey Research
EDCEP 917	Experimental Design in Education
SOCIO 724	Qualitative Methods
FSHS 893	Program Evaluation in Human Services

4. Clinical experience in counseling (12 hours)
The clinical experience is designed to enhance one's professional development by providing field-based exposure to the process of administration and supervision of guidance programs and personnel. The objectives, activities, and outcomes for this clinical experience/internship are commonly determined by the major professor (advisor), in consultation with the student and advisory committee.

EDCEP 991 Internship in Counseling and Educational Psychology (12 hours)

5. Dissertation: research (16 hours)
Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense. The dissertation work is closely supervised by the major professor with the guidance of the supervisory committee.

EDCEP 999 Doctoral Research (16 hours)

Ed.D. educational psychology

The discipline of educational psychology has a rich history founded in learning psychology and educational measurement.These historical foundations have led to a more contemporary educational psychology of applied research and evaluation. In keeping with this applied emphasis, the Ed.D. program in educational psychology provides an in-depth understanding of applied learning psychology, relevant research methods, educational measurements, and program evaluation.

Prospective students in educational psychology will be those whose career goals are to be educational psychologists, institutional researchers or program evaluators. Such positions may be found in public schools, higher education, the military, or perhaps business and industry. Students who are interested in pursuing the Ed.D. should have in mind the setting within which they wish to work. The doctoral program will provide extensive training in the use of statistical and research methods necessary to evaluate educational and training programs. The student who successfully completes the Ed.D. program in educational psychology will be instrumental in the resolution of concrete problems in a variety of educational settings and will contribute to the improvement of educational practice.

A minimum of 94 semester hours beyond the baccalaureate degree is required, including the following. (Up to 30 graduate hours earned as part of a master's degree may be used to satisfy the following requirements.)

1. Area of emphasis (48 hours)
The following courses or their equivalent (as determined by the supervisory committee) will normally be required as part of the area of emphasis for students in the Ed.D. program in educational psychology:

EDCEP 715	Principles of Assessment
EDCEP 815	Using Tests in Counseling
EDCEP 920	Advanced Educational Psychology: Learning
EDADL 825	Strategic Leadership in Education
FSHS 893	Program Evaluation in Human Services

The following are other suggested courses that are often applied to the area of emphasis requirements:

EDCEP 819	Survey Research
EDCEP 838	The College Student and the College Environment
EDCEP 857	Guidance Program Management
EDCEP 871	Consultation for Counselors
EDCEP 927	Higher Education Administration
EDSP 500	Introduction to Human Exceptionality
PSYCH 810	Learning
PSYCH 814	Advanced Cognitive Psychology
SOCIO 724	Qualitative Methodology
EDADL 886	Seminar: Qualitative Research in Education
EDEL 786	Topics: Advanced Qualitative Methods
EDSP 777	Behavior Management for Exceptional Individuals
EDSP 850	The Consulting Proccess in Special Education
EDCIP 803	Curriculum Development
EDCIP 833	Creativity in Education

2. Foundations (12 hours)
Take each of the courses listed or its equivalent.
(a) EDCEP 816 Research Methods
(b) EDADL 886 Seminar: Historical and Philosophical Analysis of Education
(c) EDCIP 910 Multicultural Curriculum Programming
(d) EDCEP 912 Psychological Bases of Educational Thought and Practice

3. Research courses (6 hours)
Research courses concerning methodology consistent with that required for the dissertation.

Two courses typically used to meet research expectations include:

EDCEP 817	Statistical Methods in Education
EDCEP 917	Experimental Design in Educational Research

4. Clinical experience (12 hours)
Objectives, activities, and outcomes for this clinical experience/internship are commonly determined by the major professor (advisor), in consultation with the student. The student will practice, with well-planned supervision, the application of knowledge, techniques, and analytic skills in an environment parallel to that of professional practice. Possible settings for the clinical/laboratory experiences include centers for educational research, test development firms, centers for faculty development and evaluation, centers for institutional research, consulting firms, local educational agencies, and state agencies.

EDCEP 991	Internship in Counseling and Educational Psychology

5. Dissertation research (16 hours)
Candidates must complete a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms. The dissertation must be successfully defended in a public, oral defense. The dissertation work is closely supervised by the major professor with the guidance of the supervisory committee.

EDCEP 999 Doctoral Research

Residency
Residency is designed to provide for the full-time intellectual involvement of the student in the university learning community. Off-campus sites require approval of the Graduate Council. Residency should involve the doctoral student in a period of full-time association with established and aspirant scholars and provide an opportunity for intensive use of campus resources such as library holdings, seminars and colloquia, and computers.

The Ed.D. program has three residency options (not including research, internship, or independent study credits) for the K-State campus:

1. Four summers within a 5-year period in which 27 hours of course work are completed;

2. Three summers within a 4-year period in which 24 hours of course work are completed, with a minimum of 6 additional hours of course work completed in one intervening semester; or

3. Twenty-four (24) hours of course work completed within 12 calendar months.

Preliminary examination
Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all areas of the program of study, 3 of which must be over the foundations courses.

Counseling and educational psychology courses

Undergraduate and graduate credit in minor field
EDCEP 502. Independent Study in Counseling and Educational Psychology. (1–3) I, II, S. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department chair.

EDCEP 525. Interpersonal Relations in the Schools. (1) I, II. A didactic and experiential course designed to develop an understanding of human relations skills in the schools. Provides knowledge and skills necessary to work effectively with students, parents, and school personnel. Particular emphasis is on the basis for interpersonal relations in education, communication skills, the facilitative relationship, working with students in groups, and conducting meetings with parents and school personnel. Pr.: EDSEC 420, 477, and 476. Simultaneous enrollment required for EDCIP 455, EDCEP 525, and EDSEC 586.

Undergraduate and graduate credit
EDCEP 711. Middle School Classroom Guidance. (3) On sufficient demand. Techniques of integrating guidance principles for pre- and early teens into a middle school concept; investigation of classroom dynamics for middle school teachers as members of the guidance team; involvement of teachers in model guidance programs. Pr.: EDCEP 315.

EDCEP 715. Principles of Assessment. (3) I, II. S. Principles of development, administration, evaluation, and constructive instructional use of paper-pencil, product, and performance assessments. Focus on norm- and criterion-referenced uses of teacher-made and published measures as an integral part of effective decision making in education. Pr.: EDCEP 315.

EDCEP 721. Mental Hygiene in the School and Community. (3) On sufficient demand. Dynamics creating different personalities and deviant behavior. The educative process as it affects personality integrity. Pr.: PSYCH 280 or FSHS 110.

EDCEP 775. Readings in Counseling and Educational Psychology. (1–3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: FSHS 110.

EDCEP 786. Topics in Counseling and Educational Psychology. (1–3) I, II, S. Examination of current topic in specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: FSHS 110.

EDCEP 795. Problems in Counseling and Educational Psychology. Credit arranged. I, II, S. Selected students are permitted to secure specialized training appropriate to the needs of the individual. The student's project may involve intensive library investigation in a special field or the collection and analysis of data pertinent to a given problem. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of a project. Pr: Background of courses necessary for the problem undertaken and consent of instructor.

Graduate credit
EDCEP 802. Stress Management for Teachers, Counselors, and Administrators. (3) On sufficient demand. Systematic training in stress-management strategies and techniques for the professional educator and for use in classroom and counseling settings. Includes knowledge of self-directed and instrumental techniques, psychophysiology of stress, issues in stress management, and role of teacher and counselor in delivering stress-management training. Pr.: EDCEP 315.

EDCEP 812. History and Philosophy of Higher Education. (3) I. History and development of higher education with a study of the philosophy, objectives, and functions of various types of institutions. Pr: Consent of instructor.

EDCEP 815. Using Tests in Counseling. (3) II. Focus on the use of tests as an integral part of counseling. Emphasizes interpretation of scores, issues of psychological and educational measurement, and selection and evaluation of instruments. Pr.: EDCEP 715.

EDCEP 816. Research Methods. (3) I, II, S. Surveys quantitative and qualitative social science research methods applied to educational topics. Includes critical analysis of published research to foster research-enlightened decision-making in professional practice. Provides a foundation in a wide spectrum of educational research methods. Pr.: Nine hours of education or consent of instructor.

EDCEP 817. Statistical Methods in Education. (3) I, II, S. An introductory yet comprehensive survey of common statistical analyses encountered in educational research. Computer oriented. Pr.: A first course in college mathematics plus either STAT 702 or EDCEP 816.

EDCEP 818. Principles of College Student Personnel Services. (3) II. Principles, history, philosophy, current professional issues and future trends in college student personnel work; an introduction to the primary student services. Pr.: Twelve hours of undergraduate social sciences and consent of instructor.

EDCEP 819. Survey Research. (3) I. Evaluation, interpretation, use, and production of survey research in education. Pr.: EDCEP 816 and 817.

EDCEP 820. Individual Intelligence Testing. (3–5) On sufficient demand. Appraisal of individual intelligence with emphasis on techniques of administration, scoring, interpreting, and applying in school settings. Supervised practice in the use of WISC-III and other tests such as the Stanford-Binet, K-ABC, and WAIS-R. Pr.: EDCEP 715 and consent of instructor.

EDCEP 822. Principles of Guidance. (3) S. This is a foundation course for secondary school counselors and addresses issues relevant to secondary school guidance programs. Pr.: FSHS 110 or PSYCH 520.

EDCEP 823. Counseling Theory. (3) I, S. Theories, methods, and problems in counseling, relating the counseling process to dynamics of human behavior. Pr.: FSHS 110 or PSYCH 520.

EDCEP 825. Social Psychology of Education. (3) II. Consideration of the literature and applications of social/psychological studies of the student, student cultures, characteristics of educational institutions, and organizational change. Pr.: EDCIP 611 or EDCEP 812 or consent of instructor.

EDCEP 829. Learning Principles for Effective Teaching. (3) On sufficient demand. Exploration of learning theories with emphasis on the application of psychological principles to the teaching-learning process, as a basis for examining and understanding contemporary research in teaching effectiveness. Pr.: EDCEP 315.

EDCEP 838. The College Student and the College Environment. (3) I. Study of the American college student and how he/she is influenced by institutional policies, practices, and other environmental variables. Special attention will be given to contemporary student development theory and research. Pr.: FSHS 110 and consent of instructor.

EDCEP 852. Career Development for School Counselors. (3) I. Addresses the knowledge and competencies necessary for school counselors to use education, career, and labor market information resources, and career guidance and counseling techniques, methods, and technology in developing programs, services, and activities to meet the career development needs of students. Pr.: FSHS 110 or PSYCH 520.

EDCEP 856. Guidance in the Elementary School. (3) II. The nature and philosophy of guidance in the elementary school; the function of specialized child appraisal and counseling techniques in the unique interrelationships of the specialist and the teacher in the team approach to elementary school guidance. Pr.: EDEL 585, EDCEP 820, and consent of instructor.

EDCEP 857. Guidance Program Management. (3) I. This course addresses the issues, knowledge, and competencies relevant to planning, implementing, and evaluating effective guidance and counseling programs to meet the needs of all students. Pr.: EDCEP 822.

EDCEP 858. Group Processes. (3) I, S. Designed to acquaint students with group proceduresas basic tools in counseling, guidance, and other education services. Pr.: EDCEP 823.

EDCEP 860. Adult Counseling. (3) I. On sufficient demand. Study of adults and the problems they face in their educational, psychological, social, and career development. Particular emphasis will be given to counseling theories and strategies important for counselors working with adults experiencing these developmental problems. Pr.: EDCEP 823 or conc. enrollment.

EDCEP 861. Management of Counseling Services for Adults. (3) On sufficient demand. Strategies for the development and implementation of counseling services for adults in school, community, business, and industrial settings. The course will focus on the integration of formal and informal educational, career development, and mental health programs developed for adults having life adjustment problems. Local, state, and federal programs and agencies and their role in adult counseling services will be examined. Pr.: EDCEP 823 and 860.

EDCEP 862. Leisure Counseling. (3) On sufficient demand. Course develops leisure counseling models for use in community and institutional recreational programs and to provide skills and competencies in assessing, interviewing, and counseling individuals and groups in the use of leisure experiences. Pr.: REC 725 and/or EDCEP 858. Same as REC 862.

EDCEP 863. Trends in Career Development. (3) II. Integration of major research/issue/policy contributions to major aspects of career development including occupational adjustment and vocational fitness. Pr.: FSHS 110 or PSYCH 520.

EDCEP 871. Consultation for Counselors. (3) II. This course acquaints students with the major models of consultation that may be used by counselors for intervention with individuals and organizations. Techniques, issues and ethical considerations are also addressed. Pr.: EDCEP 823 and 858.

EDCEP 875. Administration of College Student Personnel Services. (3) I. Planning, budgeting, personnel supervision and evaluation, office management, administrative use of computers, program evaluation and related applications in the primary college student personnel services. Pr.: EDCEP 818 and 838.

EDCEP 877. Practicum in Counseling. (3) I, II, S. This is a developmental counseling skills course addressing influences on the helping process such as personal characteristics, theoretical orientation, verbal and nonverbal behaviors, and ethical considerations. Includes research applications, case conceptualization, evaluation, simulation, and supervised individual and group practice in the field. Pr.: 24 credit hours of prescribed counseling curriculum.

EDCEP 885. Practicum in College Student Personnel Work. (3) I, II. Supervised professional experience in college student personnel services. Pr.: EDCEP 818, 838, 875, and consent of instructor.

EDCEP 886. Seminar in Counseling and Educational Psychology. (Var.) On sufficient demand. Intensive discussion of a problem of current professional interest based on study of pertinent original literature. May be repeated with consent of supervisory committee. Pr.: Consent of instructor.

EDCEP 887. Counseling Internship. (1–3) I, II. This supervised internship includes activities that a regularly employed school counselor would be expected to perform. The student will engage in individual counseling, group work, developmental classroom guidance, use within an ethical framework and a sensitivity to individual characteristics. Pr.: 36 credit hours of School Counseling prescribed curriculum.

EDCEP 898. Master's Report. (Var.) I, II, S. Pr.: Consent of instructor.

EDCEP 899. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor.

EDCEP 912. Psychological Bases of Educational Thought and Practice. (3) S. In studying educational applications of behavioral, social cognitive, and cognitive learning theories, attention is given to historical milieus of origin, relationships to major educational philosophies, relationships to features of instruction, and classroom motivation, and evaluation of impact on contemporary educational thought and practice. Pr.: EDCEP 315 or EDACE 790 and either EDCIP 310, EDADL 811, EDADL 813.

EDCEP 915. Theory of Measurement. (3) On sufficient demand. A course designed to provide the theoretical background needed for students who wish to (1) develop greater competence in practical uses of tests in educational settings, (2) pursue academic study of measurement theory, and (3) develop instruments for research use. Pr.: EDCEP 715.

EDCEP 917. Experimental Design in Educational Research. (3) II. Philosophy, planning, and evaluation of research in education. Experimental designs appropriate for educational research with special emphasis on multivariate procedures. Computer oriented. Pr.: EDCEP 817.

EDCEP 920. Advanced Educational Psychology: Learning. (3) On sufficient demand. The learning process, with special emphasis on human abilities and early and contemporary learning theories, with applications to selected recent developments in teaching and persistent problems and issues in education. Pr.: EDCEP 315 or its equiv.

EDCEP 924. Theories of Vocational Counseling. (3) On sufficient demand. A historical and contemporary analysis of systems and theories of vocational psychology and their implications for use in the counseling setting. Pr.: EDCEP 823, 852, and 863.

EDCEP 927. Higher Education Administration. (3) II. Administration theory applied to the organization and administration of colleges and universities; special reference to structure, governing boards, administrative roles, decision-making, and analysis of selected problems. Pr.: EDCEP 812.

EDCEP 948. Advanced Student Development Theory in College Student Affairs. (3) S. In-depth examination of the major young adult and adult development models and their implications within the context of student affairs in higher education. Pr.: EDCEP 816, 818, 838, and consent of instructor.

EDCEP 951. Multicultural Counseling. (3) S. Adaptations of generic counseling skills to meet the needs of diverse populations. Pr.: EDCEP 823 and 877.

EDCEP 955. Professional Counseling Ethics. (3) I. Examination of ethical standards developed by professional organizations of counselors. Current interpretations of standards and applications are developed through case studies, essays, reading, and literature review. Pr.: EDCEP 823, 877, and EDCEP 822 or 856.

EDCEP 958. Advanced Group Counseling. (3) II. The examination of selected group counseling theories and their relevance for the practice of group counseling in a variety of settings. Pr.: EDCEP 858.

EDCEP 959. Practicum in Group Counseling. (3) On sufficient demand. Supervised group counseling experience in a variety of settings. Pr.: EDCEP 858 and 958.

EDCEP 967. Advanced Counseling Appraisal. (3) II. Advanced application of appraisal models and methods for use with clientele. Specific personality tests and classification systems will be addressed. Pr.: EDCEP 715, EDCEP 815, PSYCH 505.

EDCEP 977. Advanced Counseling Practicum. (3) I, II. Intense supervised practice in counseling. Particular emphasis will be given to the development of skills for intervention into human problems and time-limited case management. Pr.: EDCEP 823, 877, and 887.

EDCEP 985. Advanced Counseling Theory. (3) I. Reading and analysis of primary sources in major counseling theories. Written reaction papers, presentations, discussion, and development of a major paper on a personal theory. Pr.: EDCEP 823 and 887.

EDCEP 986. Advanced Seminar in Counseling and Educational Psychology. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDCEP 987. Counseling Supervision Practicum. (3) On sufficient demand. An advanced course in the theory, techniques, and problems of supervising persons being trained as counselors. Course emphasis is on actual supervisory experiences with beginning counselors. Open to advanced doctoral students only with consent of instructor.

EDCEP 991. Internship in Counseling and Educational Psychology. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of Counseling and Educational Psychology graduate faculty members. A maximum of 6 credit hours may be chosen from the areas listed. Pr.: Consent of instructor.

EDCEP 999. Research in Counseling and Educational Psychology. (Var.) I, II, S. Individual investigation in the field of a student's specialization. Pr.: Sufficient training to carry on the line of research undertaken.

For more information

For additional information and application materials please contact:
Office of Graduate Studies
College of Education
17 Bluemont Hall
1100 Mid-Campus Drive
Manhattan, KS 66506–5315
785-532-5595
Fax: 785-532-7304
E-mail: gradstudy@ksu.edu
Home page: http://www.educ.ksu.edu/

Theatre

See Speech Communication, Theatre, and Dance.

Veterinary Medicine

Dean
Ralph Richardson

Associate dean
Ronnie G. Elmore

Doctor of veterinary medicine degree

Admission

Enrollment in the College of Veterinary Medicine is limited to well-qualified students who have completed the minimum 70 required hours of pre-professional courses (see pre-professional requirements). A student must have at least a 2.80 grade point average over the pre-professional requirements and over the last 45 hours of undergraduate college work in order to be eligible for an interview. A grade below a C in a pre-professional requirement is not acceptable. Nonresidents must meet the same scholastic requirements to receive an application for the professional curriculum and consideration for selection. All applicants must take the general test of the Graduate Record Examination.

Personal interviews are required of all students admitted. Selection is based upon academic achievement and professional potential as determined by the interview with the admissions committee. Applicants are evaluated on such items as motivation, maturity, communication skills, experience with and knowledge of animals, and experience with and knowledge of veterinary medicine. Therefore, all students interested in applying to the College of Veterinary Medicine are encouraged to have adequate animal exposure and to have work experience related to veterinary medicine to demonstrate to the admissions committee an understanding of the profession.

Selection for admission to the curriculum in veterinary medicine is based on individual merit of qualified applicants who qualify for resident tuition.

Second preference is given to nonresident applicants from states with which K-State has a contract to provide veterinary medical education and who are certified by their state. Since the contract status changes frequently, interested applicants should contact the assistant dean for admission, College of Veterinary Medicine, for current information regarding contract states. There is also a limited number of at-large and international positions available.

After July 1, applications for admission to the professional curriculum may be obtained online or from the Office of the Assistant Dean of the College of Veterinary Medicine for consideration in the class starting the following August.

No applications are accepted after October 1.

Pre-professional requirements

The pre-professional work may be pursued at Kansas State University in the College of Arts and Sciences or the College of Agriculture or in other academically accredited institutions. Listed below are required courses, with K-State course numbers listed at left.

Requirements		
ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking	2
	or	
SPCH 106		
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 510	Embryology**	4
BIOL 511	Embryology Laboratory**	1
BIOL 455	Microbiology (with lab)	4
ASI 500	Genetics	3
Social sciences and/or humanities		12
Electives		9
Total		70

**If a course in embryology or developmental biology is not offered at the school you are attending, comparative anatomy, reproductive physiology, or an advanced animal biology course may be considered for a substitute. Written permission for substitution should be obtained from the admissions committee prior to enrolling in the substituted course.

All science courses (chemistry, physics, biology, and genetics) must have been taken within six years of the date of enrollment in the professional program. All pre-professional requirements must be graded.

A bachelor of science degree may be granted by the College of Agriculture or the College of Arts and Sciences upon completion of residency and academic requirements. Detailed information should be obtained from the dean's office of the appropriate college.

Fees for veterinary medical students

College of Veterinary Medicine fees are higher than undergraduate fees. Since these are determined annually, contact the Office of the Associate Dean for current fees.

Doctor of veterinary medicine curriculum

The curriculum in veterinary medicine at Kansas State University was established to give Kansas residents preparation for entry into a variety of veterinary medical careers. The professional curriculum in veterinary medicine is balanced and comprehensive with consideration given to all species.

The academic standards of the College of Veterinary Medicine govern honors, progression, probation, and dismissal. Students will be informed of their academic status by the dean's office based on information supplied by the university registrar. The scholastic record of each student will be reviewed following each period of required registration in the veterinary curriculum.

Studies must be taken as prescribed. Elective courses may be taken with permission only. For admission to the curriculum in veterinary medicine, consult the previously listed pre-professional requirements.

Completion of the professional curriculum leads to the degree of doctor of veterinary medicine. (Hours required for graduation: pre-professional 70; professional 165; total 235.)

First professional year

Fall semester		Hrs
AP 700	Gross Anatomy	6
AP 702	Nutritional Physiology and Metabolism	3
AP 710	Microanatomy	5
AP 737	Veterinary Physiology I	5
DVM 700	Veterinary Orientation	1
DMP 705	Veterinary Immunology	2
		20

Spring semester		
AP 705	Gross Anatomy II	6
AP 720	Veterinary Neuroscience	2
AP 747	Veterinary Physiology II	6
CS 701	Clinical Skills I	1
DVM 701	Ethics and Jurisprudence	1
DMP 708	Principles of Epidemiology	2
		20

Second professional year

Fall semester		Hrs
AP 770	Pharmacology	5
DMP 712	Veterinary Bacteriology and Mycology	5
DMP 715	General Pathology	5
DMP 718	Veterinary Parasitology	5
		20

Spring semester		
DMP 720	Systemic Pathology	5
DMP 722	Veterinary Virology	3
DMP 759	Laboratory Animal Science	2
DMP 775	Clinical Pathology	3
CS 703	Clinical Skills II	1
CS 709	Medicine I	4
CS 715	Radiology	3
		21

Third professional year

Fall semester

		Hrs.
DMP 750	Avian Diseases	3
DMP 777	Laboratory Diagnosis	1
DMP 801	Toxicology	3
CS 711	Medicine II	4
CS 712	Food Animal Medicine	4
CS 728	Theriogenology	3
CS 729	Surgery I	5
		23

Spring semester

DMP 753	Zoonosis and Preventative Medicine	3
CS 704	Clinical Skills III	1
CS 710	Companion Animal Medicine	4
CS 713	Production Medicine	2
CS 714	Clinical Nutrition	3
CS 730	Surgery II	5
		18

Fourth professional year

Summer, fall, and spring semesters

33 hours required core rotations:		Hrs.
CS 717	Small Animal Medicine	6
CS 716	Clinical Small Anmal Surgery	6
CS 719	Equine Medicine and Surgery	6
CS 721	Agricultural Clinical Practices	6
CS 723	ULN–KSU Food Animal Production Medicine	1
CS 724	Veterinary Diagnostic Imaging I	3
CS 725	Clinical Anesthesia	3
VD 851	Diagnostic Medicine	2
		33

Plus minimum 9 hours of mini-electives and/or rotational electives for a total of a minimum of 42 hours.

Veterinary medical library

The College of Veterinary Medicine has a well-equipped library that is a part of the Kansas State University libraries system and consists of approximately 35,000 volumes that deal with all phases of veterinary medical literature and many allied fields. It subscribes to 900 journals and has medical/veterinary CD-ROM data bases.

Anatomy and physiology

The Department of Anatomy and Physiology presents courses in cell and systemic physiology, gross anatomy and microscopic anatomy, nutrition and metabolism, and pharmacology at both the undergraduate and graduate levels. For information on graduate work, courses, and faculty, see Anatomy and Physiology. Biophysical electronic instrumentation, an electron microscope, environmental chambers, scintillation counter, respiratory mass spectrometer, treadmills, and other instruments are available for physiological and anatomical studies.

Professional veterinary medicine courses

For complete course lisings, see the Department of Anatomy and Physiology.

AP 700. Gross Anatomy I. (6)

AP 702. Nutrition Physiology and Metabolism. (3) I. The physiological and metabolic aspects of nutrition presented to form a basis for the applicaton of clinical nutrition in medicine. Major nutrient groups and nutrients will be approached from digestive, physiological, and metabolic points of view. Pr.: First year standing in College of Veterinary Medicine.

AP 705. Gross Anatomy II. (6)

AP 710. Microscopic Anatomy I. (3)

AP 720. Veterinary Neuroscience. (2)

AP 737. Veterinary Physiology I. (6)

AP 740. Veterinary Orientation. (1)

AP 747. Veterinary Physiology II. (6)

AP 770. Pharmacology. (5)

AP 801. Clinical Skills I. (1)

AP 886. Clinical Nutrition. (3)

AP 891. Beef Nutritional Health and Feeding Management. (1)

AP 892. Dairy Nutritional Health and Feeding Management. (1)

AP 893. Equine Nutritional Health and Feeding Management. (1)

Clinical sciences

The KSU-Veterinary Medical Teaching Hospital (KSU-VMTH) is equipped for diagnosis and treatment of animal disease and for instruction of veterinary students, house officers, and postgraduate veterinarians.

The hospital has a capacity of 82 large animal patients and 150 small animal patients. Clinical faculty accompanied by students provide clinical veterinary service to clients in the local community, for clients of referring veterinarians from an eight-state region, and on local and regional livestock farms. In addition to caring for sick animals, they provide preventative medical services and consultation on production medicine and management. KSU–VMTH provides full veterinary service for clients and referring veterinarians from Kansas, Nebraska, Missouri, and Oklahoma, and some educational programs are conducted in conjunction with the University of Nebraska Veterinary Educational Center at Clay Center, Nebraska.

Fourth-year students are active participants in the hospital and clinical services. Students are regularly assigned on a rotation basis during the year to various specialists on the clinical and pathology staffs.

The department presents courses in medicine, surgery, dermatology, exotics, ophthalmology, theriogenology, and other clinical specialties to veterinary students and post-DVM trainees. For more information on graduate work, courses, and faculty, see entry the clinical section.

Professional veterinary medicine courses

For complete descriptions, see the Department of Clinical Sciences.

CS 701. Clinical Skills I. (1) II. Introduction to terminology and thought/organization for clinical veterinary medicine. Emphasis on problem identification from a clinical data base, and basic veterinary skills with animals. Three hours lab a week. Same as AP 801. Pr.: First-year standing in the College of Veterinary Medicine.

CS 703. Clinical Skills II. (1) II. Continuation of Clinical Skills I. Introduction to clinical cases, data base accumulation, problem identification, problem solving, and basic veterinary skills with animals. Three hours lab week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 704. Clinical Skills III. (1) II. Laboratory instruction and experience in hand skills for physical examination and for veterinary therapy. Three hours lab a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 709. Medicine I. (4) II. Consideration of medical and pathophysiologic aspects of diseases affecting the musculoskeletal, respiratory, cardiovascular special senses, nervous hemic and lymphatic systems. Four hours lec a week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 710. Companion Animal Medicine. (4) II. A study of the etiology, clinical signs, diagnosis, treatment, and control of infectious or contagious diseases which affect horses, dogs, and cats. Four hours lecture a week. Pr.: Third-year standing in College of Veterinary Medicine.

CS 711. Medicine II. (4) I. Consideration of the medical and pathophysiological aspects of diseases affecting the gastrointestinal, endocrine, urinary, and integumentary systems. Four hours lec. a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 712. Food Animal Medicine. (4) I. A study of the etiology clinical signs, diagnosis, treatment and control of diseases which affect cattle, swine, and sheep. Four hours lec a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 713. Production Medicine. (2) II. The role of the veterinarian in livestock production units, including interactions with producers, nutritionists, investors and others in decision analysis. Emphasis is on the professional service that veterinarians provide to beef feedlot, cow/calf, swine, dairy, equine, and dog kennel segments of animal production. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 714. Clinical Nutrition. (3) II. The clinical aspects of nutrition as it relates to (a) medical and surgical management of diseased and convalescent animals (therapeutic nutrition), and (b) programs of disease prevention of the common domestic species of food-producing, companion animals, pet birds, and exotic animals (nutritional preventative medicine). Same as ASI 886 and AP 886. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 715. Radiology. (3) II. The theory and principles of x-rays, production and interpretation of radiographs and exposure factors, special radiographic methods, film storage and handling, processing, safety measures, and biologic effects of radiation. Three hours lec. a week. Pr.: Second-year standing in the College of Veterinary Medicine.

CS 716. Clinical Small Animal Surgery. (6) I, II, S. This course is designed to train veterinary students in the diagnosis and treatment of small animal surgical diseases through participation in clinical service in the Veterinary Teaching Hospital. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 717. Clinical Small Animal Medicine. (6) I, II, S. The study of preventive medicine, internal medicine, and special medicine in the setting of the veterinary medical center. Problem solving, differential diagnosis, diagnostic procedures, and medical treatment of small animal disease will be emphasized using veterinary patients. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 719. Basic Equine Medicine and Surgery Clinics. (6) I, II, S. This course will offer the veterinary student a general exposure to clinical problems and problem-solving of medical and surgical diseases of horses. The student will be responsible for and involved in the diagnosis, treatment and nursing care of equine patients affected by a variety of conditions. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 720. Advanced Equine Theriogenolgy. (1) I. An in-depth exposure to methods of maximizing reproductive efficiency in the mare and the stallion. Advanced equine reproductive physiology, diagnostics, and therapeutics are emphasized. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 721. Agricultural Clinical Practices. (6) I, II, S. A study of the role of the veterinarian in the practice of clinical medicine in livestock production units. Students will work under faculty supervision in local practice and in-hospital situations. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 722. Advanced Agricultural Clinical Practices. (Var.) I, II, S. Advanced studies in the practice of veterinary medicine and surgery emphasizing the application of problem-solving methodology in livestock health and production programs. Pr.: CS 721 or consent of the instructor.

CS 723. UNL–KSU Food Animal Production Medicine. (1) I, II, S. A study of the role and responsibility of the veterinarian in the practice of clinical veterinary medicine in livestock production units. Students will work under University of Nebraska–Lincoln and KSU faculty supervision at the Great Plains Veterinary Education Center with swine, sheep and beef cattle. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 724. Veterinary Diagnostic Imaging I. (3) I, II, S. Radiographic, ultrasonographic and nuclear imaging in the clinical setting, with emphasis on making/identifying images of diagnostic quality, interpretation, indications for imaging, and radiation safety. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 725. Clinical Anesthesia. (3) I, II, S. Practical instruction in the skills and techniques used in the practice of clinical veterinary anesthesia of both large and small animals. May be repeated once. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 726. Clinical Externship and/or Programmed Study. (Var.) I, II, S. Practical experience with the daily operation of veterinary practice, insights into the role of veterinarians in private industry, and/or opportunity to become involved in specialty areas relating to veterinary medicine in other academic institutions. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 727. Ophthalmology. (3) I, II, S. The study of the surgery and medical diagnosis and treatment of ocular disease in animals in the setting of the veterinary medical hospital. Problem solving, differential diagnosis, diagnostic procedures, and medical and surgical therapy will be emphasized using veterinary patients. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 728. Theriogenology. (3) I. Consideration of prevention, diagnosis, and treatment of disease and maintenance of health and productivity of the genital tract of domestic animals. Three hours lec a week. Pr.: Third-year standing in College of Veterinary Medicine.

CS 729. Veterinary Surgery I. (5) I. Introduction to the basics of veterinary anesthesia, surgical techniques, and patient management by a systems design. Problems common to all species of domestic animals will be presented to provide foundations of surgical knowledge and experience. Four hours lec and one hour lab a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 730. Veterinary Surgery II. (5) II. A continuation of Veterinary Surgery I. Introduction to the basics of veterinary anesthesia, surgical techniques, and patient management by a systems design. Problems common to all species of domestic animals will be presented to provide foundations of surgical knowledge and experience. Four hours lecture and one laboratory a week. Pr.: Third-year standing in the College of Veterinary Medicine.

CS 732. Topics in Equine Internal Medicine. (2) S. Selected topics in equine internal medicine. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 736. Pleasure Horse Medicine. (2) I. In-depth exposure of most frequent concerns encountered by the equine practioner. Topics will be addressed as problems rather than specific diseases. Management differentials, diagnosis and therapy will be emphasized. Lectures 4 hours per week, no laboratory sessions. Pr.: Fourth-year standing in College of Veterinary Medicine.

Doctor of veterinary medicine degree and graduate credit with permission of instructor.

CS 800. Problems in Medicine or Surgery. (1–9) I, II, S. The course provides for the study of medical or surgical problems. The student, in conference with the major professor, outlines the methodology and procedures, conducts the study, and prepares a detailed report. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 802. Advanced Small Animal Surgery. (Var.) I, II, S. This course provides veterinary students an opportunity for advanced training in the diagnosis and treatment of small animal surgical diseases through participation in clinical service in the Veterinary Medical Teaching Hospital. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 716.

CS 803. Advanced Small Animal Medicine. (Var.) I, II, S. Advanced topics in preventative medicine, kennel medicine, greyhound medicine, internal medicine, dermatology, neurology and cardiology. The student will be required to participate in a special problem with a written report. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 717.

CS 806. Advanced Equine Medicine and Surgery. (Var.) I, II, S. This course provides an opportunity for students to pursue equine clinical studies in depth and assume substantial responsibility for care of hospitalized cases. Students will present a seminar on a medicine or surgical subspecialty and pursue a special problem. Pr.: Fourth-year standing in the College of Veterinary Medicine and CS 719.

CS 813. Beef Production Medicine. (1) I. A study of the development, initiation, maintenance and monitoring of production-oriented health management delivery systems in beef cattle operations. Pr.: Fourth-year standing in the College of Veterinary Medicine..

CS 814. Veterinary Diagnostic Imaging II. (3) I, II, S. Students will receive advanced training in radiologic interpretation and alternate imaging procedures. Emphasis will be on didactic and hands-on training in ultrasound imaging. Pr.: CS 724.

CS 820. Equine Lameness. (2) II. Concentration on musculoskeletal origins of lameness problems in horses, including diagnosis, treatment, management and prognosis. Pr.: Fourth-year standing in the College of Veterinary Medicine.

CS 821. Vet Medicine for South American Camelids. (1) II. The health concerns of South American Camelids are presented in terms of medicine, surgery, theriogenology, and associated disciplines. Pr.: Third- or fourth year standing in the College of Veterinary Medicine, DVM degree.

CS 822. Exotic Animal, Wildlife and Zoo Medicine. (3) I, II, S. Study of exotic, wildlife and zoo animal medicine through participation in the clinical service in the Veterinary Medical Teaching Hospital. Problem solving, differential diagnosis, diagnostic procedures, and medical and surgical therapy of nondomestic animals will be emphasized. Pr.: Fourth-year standing in the College of Veterinary Medicine.

Graduate credit only with permission of the instructor

CS 850. Research in Medicine. (1–6) I, II, S. An attempted solution of some of the medical and parasitological problems confronting the practitioner of veterinary medicine. Pr.: consent of staff.

CS 852. Interpretation of Radiology Studies of Body Systems. (3) I, in odd years. Advanced discussions of radiologic interpretation, indications and interpretation of alternate imaging procedures (MRI, CT, nuclear medicine, ultrasound). Pr.: DVM degree or consent of department head prior to registration.

CS 858. Orthopedic Surgery. (4) II, in even years. Fundamentals, theory, and practice concerning genetic, metabolic, infectious, neoplastic, and traumatic diseases of bones and joints. Pr.: DVM degree or consent of department head.

CS 859. Clinical Sciences Seminar. (1) I, II, S. A required seminar for all house officers and graduate students in the Department of Surgery and Medicine. One hour conference weekly. May re-enroll for total maximum of two credits. Pr.: consent of department head.

CS 864. Equine Hard Tissue Surgery. (2) I, in even years. Selected procedures in equine orthopedic surgery will be presented. Discussions will review treatment selection and indications, alternative modalities, intraoperative techniques, pathophysiology, adjunctive therapies, aftercare and complications. Pr.: DVM degree or consent of department head.

CS 865. Equine Soft Tissue Surgery. (2) II, in even years. A presentation of complex surgical techniques not available in the professional curriculum will be provided for the post-DVM trainee. The indications reaction, technical aspects, therapeutic attributes and complications of selected procedures will be addressed. Pr.: DVM degree or consent of department head.

CS 867. Advanced Diagnostic Imaging —Small Animal. (1) I. Case presentation/discussion of diagnostic imaging techniques used in small animal veterinary practice, including radiography, ultrasonography, nuclear imaging, magnetic resonance imaging, and computer tomography. Clinical cases will demonstrate imaging methods and technology used in the various body systems, with an emphasis on interpretation and clinical diagnosis. Students may re-enroll for a maximum of three credits. Pr.: DVM degree.

CS 890. Clinical Sciences Problems. (1) II. Advanced instruction in research topics and technologies emphasizing various clinical disciplines.

CS 895. Research Methods. (1) I. Discussion of research design, grantsmanship, practical statistics, manuscript preparation, and ethics. Pr.: DVM degree or consent of department head.

CS 899. Thesis Research in Clinical Sciences. (1–6) I, II, S. Individual research in any of the fields of Clinical Sciences. Pr.: Graduate standing. This work may form the basis of the M.S. thesis.

Pathology/microbiology

Basic courses in pathology/microbiology, parasitology, virology, public health, and clinical pathology are offered for students enrolled in the veterinary medicine curriculum. Practical necropsy experience is provided for students as an adjunct to their pathology education and as an aid to disease diagnosis.

Professional veterinary medicine courses

PA 703. General Pathology. (5) I. Study of the mechanisms of disease including degeneration/necrosis, inflammation, circulatory disturbances, and neoplasia. Introduction to gross and microscopic anatomy. Three hours lec. and six hours lab a week. Pr.: Second-year standing in College of Veterinary Medicine.

PA 710. Systemic Pathology. (5) II. Pathology of the organ systems of domestic animals including gross and microscopic study of lesions. Three hours lec. and six hours lab a week. Pr.: PA 703.

PA 859. Laboratory Animal Science. (2) II. Consideration of the management and health of common species of laboratory animals. Two hours lec. a week. Pr.: Second-year standing in College of Veterinary Medicine.

LM 705. Principles of Veterinary Immunology. (2)

LM 712. Veterinary Bacteriology and Mycology. (5)

LM 722. Veterinary Virology. (3)

LM 753. Zoonoses and Preventive Medicine. (3)

LM 755. Principles and Methods of Epidemiology. (2)

LM 775. Clinical Pathology. (3)

LM 777. Laboratory Diagnosis. (1)

LM 793. Veterinary Parasitology. (5)

Diagnostic medicine/ pathobiology

Head

M. M. Chengappa

Professors Kennedy, Phillips, Strafuss, and Vorhies; Assistant Professors Briggs, Frank, and Veatch; Emeriti: Professor Anthony; Associate Professors Gray and Milleret.

The department's academic responsibilities include teaching diagnostic necropsy and laboratory procedures to fourth-year professional students and graduate students.

The department serves the livestock and companion animal industry by conducting investigational procedures to identify animal disease problems, by developing research projects related to disease pathogenesis and diagnosis. The department's diagnostic laboratory is nationally recognized as fully accredited with capabilities in all areas of diagnostic medicine by A.A.V.L.D.

Professional veterinary medicine courses

VD 847. Avian Diseases. (3) I. The prevention, diagnosis, and treatment of avian diseases. Three hours lec. a week. Pr.: Third-year standing in the College of Veterinary Medicine.

VD 851. Necropsy and Diagnostic Investigations. (2) I, II, S. Practical experience in necropsy procedures and laboratory findings. Same as CS 851, LM 851. Pr.: Fourth-year standing in the College of Veterinary Medicine.

For more information

College of Veterinary Medicine
101 Trotter Hall
Manhattan, KS 66506
785-532-5660
Home page: http://www.vet.ksu.edu

Women's Studies

Director

Jackie Spears

Graduate faculty

Kate Anderson, M.F.A., University of Connecticut.

Karren Baird-Olson, Ph.D., University of New Mexico.

Janet Benson, Ph.D., Brandeis University.

Dana Britton, Ph.D., University of Texas–Austin.

Catherine Cozzarelli, Ph.D., University of New York–Buffalo.

LouAnn Culley, Ph.D., Standford University.

Karen DeBres, Ph.D., Columbia University.

Torry Dickinson, Ph.D., University of New York–Binghamton.

Elizabeth Dodd, Ph.D., Indiana University.

Carol Franko, Ph.D., University of Wisconsin.

Marion Gray, Ph.D., University of Wisconsin.

Don Hedrick, Ph.D., Cornell University.

Angela Hubler, Ph.D., Duke University.

Lillian Kremer, Ph.D., Kansas State University.

Mary McElroy, Ph.D., University of Maryland.

Diane McGrath, Ph.D., University of Illinois.

Bonnie Nelson, Ph.D., Pennsylvania State University.

Carol Oukrop, Ph.D., University of Iowa.

Linda Richter, Ph.D., University of Kansas.

Robert Shoop, Ph.D., University of Michigan.

Carol Sigler, Ph.D., Florida State University.

Jacqueline Spears, Ph.D., Kansas State University.

Dolores Takemoto, Ph.D., University of Southern California.

Linda Thurston, Ph.D., University of Kansas.

Michael Timberlake, Ph.D., Brown University.

Cia Verschelden, Ed.D., Harvard.

Naomi Wood, Ph.D., Duke University.

Sue Zschoche, Ph.D., University of Kansas.

Program description

The program offers a graduate certificate for students in M.A., M.S., doctoral, and professional programs at K-State. Students have the opportunity to work with specialists in feminist theory, scholarship, and pedagogy from different disciplines. The certificate will enhance job opportunities by broadening students' perspective on gender issues and by preparing them to teach women's studies courses.

Program requirements

The certificate consists of 12 hours of graduate level courses in women's studies and/or gender. One core course (WOMST 605, Gender: An Interdisciplinary Overview of Feminist Thought and Practice) is required. Three other courses can be chosen from a variety of fields.

Approved elective courses

ART 654	Women in Art
ENGL 670	Topic: Women in the 18th Century
ENGL 695	A rubric under which a variety of courses are offered, including Women and Popular Culture
ENGL 740	Feminist Literary Theory
ENGL 850	Gender and Power in Shakespeare and the Renaissance
HIST 512	Women in European History
HIST 540	American Women (1600 to Civil War)
HIST 542	American Women (Civil War to present)
HIST 551	History and Politics of Family Violence (Intersession only)
HIST 980	Topic: Gender in European History
HIST 984	Topic: Gender in American History
JMC 612	Gender Issues and the Media
KIN 796	Gender Issues and Sports and Exercise
PHILO 525	Social and Political Philosophy (including feminist issues in philosophy)
POLSC 606	Gender and Politics
PSYCH 540	Psychology of Women
PSYCH/ SOCWK 543	Women's Mental Health Issues
PSYCH 563	Gender Issues in the Workplace
SOCIO 545	Sociology of Women
SOCIO 665	Women and Crime
ANTH/ SOCIO 508	Male and Female: Cross-Cultural Perspectives
ANTH 633	Gender, Power, and International Development
SOCWK 580	Women's Perspectives on Peace and War (Intersession Only)
THTR 782	Women in Theater
EDCIP 735	Curriculum Materials for Non-Sexist Teaching
EDACE 750	Women, Education, and Work
FSHS 600	Economic Status of Women

Other appropriate graduate-level Topics and Readings courses are offered every year in a variety of disciplines. Courses such as Philosophy of Feminism (PHILO 560) are also offered, though less frequently. Thus, graduates would have a large selection of classes to choose from each year.

Women's studies courses

Undergraduate and graduate credit in minor field

WOMST 500. Topics in Women's Studies. (1–3) Exploration of an interdisciplinary topic in women's studies, such as Women in Science, Women and Leadership.

WOMST 505. Independent Study in Women's Studies. (1–3) I, II. Independent, interdisciplinary, supervised study in an area which does not fall within the boundaries of a traditional department. May be repeated once for credit with change of topic.

WOMST 506. Approaches in Women's Studies. (3) I. An interdisciplinary examination of the interlocking dynamics of race, class, sexuality and gender in women's lives. Focus is on contemporary womanist and feminist theoretical and methodological approaches to addressing how race, class, sexuality, and gender inform women's experiences. Experiential exercises and activism projects are a key component of the course. For students with a strong interest and/or background in Women's Studies, especially secondary majors and minors, and graduate students.

WOMST 510. The History and Politics of Family Violence. (3) Intersession only. Explores the history of family or domestic violence in America as a social, cultural, legal, and public policy issue from the colonial period to the present. Stress is placed upon the cultural roots and evolution of domestic law. The development of state-controlled social welfare agencies as well as the emergence of the "battered women's movement" are emphasized.

WOMST 605. Gender: An Interdisciplinary Overview. (3) Advanced interdisciplinary overview of theory and scholarship on women and gender from disciplines in social sciences, humanities, and professions.

WOMST 700. Advanced Topics in Women's Studies. (V) Provides an in-depth theoretical and empirical analysis of scholarly works relating to an interdisciplinary topic in Women's Studies. Pr.: Junior standing or above and instructor permission.

For more information

Women's Studies
Graduate Faculty Committee
Kansas State University
3 Leasure Hall
Manhattan, KS 66506
785-532-5738
E-mail: bonnie@ksu.edu
Home page: http://www.ksu.edu/womst

K-State Research and Extension

Marc A. Johnson, Director
George E. Ham, Associate Director
Richard Wootton, Associate Director
113 Waters Hall
785-532-6147

K-State Research and Extension is dedicated to a safe, sustainable, competitive food and fiber system and to strong, healthy communities, families, and youth through integrated research, analysis, and education. K-State Research and Extension provides practical, research-based information and educational programs to address critical issues facing individuals, families, agricultural producers, business operators, and communities.

K-State Research and Extension is organized into the following core mission themes; agricultural industry competitiveness; food, nutrition, health, and safety; natural resources and environmental management; youth, family and community development.

One K-State Research and Extension partner, the Kansas Agricultural Experiment Station (KAES), conducts original research both on and off campus. Twenty-four departments in five colleges are involved. K-State Research and Extension is also strongly allied with the Graduate School in training graduate students; interested graduate students are encouraged to seek research assistantships. Many undergraduate students work for K-State Research and Extension, which greatly adds to the classroom experience. Off-campus research is centered at two research-extension centers, two research centers, and 11 experiment fields in various parts of the state.

The other K-State Research and Extension partner, the Cooperative Extension Service, provides an important learning bridge between the university and the people of the state. It applies scientific knowledge, principles, and practices to the grassroots problems of Kansans. At the same time, this unique information delivery system brings back requests for new knowledge to the research staff at the university. The Cooperative Extension Service staffs five area offices (two operate as part of a Research/Extension Center) and helps maintain county extension offices, staffed by off-campus K-State faculty members, in all 105 Kansas counties.

County extension agents, as official representatives of the United States Department of Agriculture and K-State, are responsible for making people aware of educational programs affecting agriculture, family living, youth, community development, and related areas. The agents serve as a local source of information regarding programs of many states and federal agencies, and then help people apply this information to their specific situation.

Information is published in scientific journals; in station bulletins, extension bulletins, national and international conferences; and in popular journals and news releases to the press and radio and television stations. Requests for station publications should be sent to the Distribution Center, Umberger Hall.

Agricultural Experiment Station

Western Kansas Agricultural Research Centers: Colby–Garden City–Hays
Patrick I. Coyne, Head and Professor

Agricultural Research Center–Hays
Professors Brethour, Harvey, and Martin; Associate Professors Kofoid, Seifers, Stahlman, and Stegmeier; Assistant Professors Thompson and Vanzant.

Investigations are primarily related to plant and animal systems specific to western Kansas, where rainfall is limited. They include beef grazing, feeding, and breeding studies; crop improvement, with special emphasis on wheat, sorghum, pearl millet, and specialty crop improvement; soil management; weed control; plant disease; and insect management.

Northwest Research-Extension Center–Colby
Associate Professors Lamm, Schwulst, and Sunderman.

Major areas of research are crop improvement; soil management; irrigation; sheep production; and horticulture.

Southwest Research-Extension Center–Garden City and Tribune
Professor Greene; Associate Professors Buschman, Kreikemeier, Norwood, Schlegel, and Witt; Assistant Professor Currie.

Current investigations involve irrigation research; dryland soil and crop management, crop improvement; weed control; insect and other pest control in crops and livestock; soil management; and beef cattle nutrition and management studies.

KSU Southeast Agricultural Research Center
Lyle W. Lomas, Head and Professor

Professors Moyer and Sweeney; Associate Professor Coffey; Assistant Professors Kelley and Long.

Research focuses on soil and water conservation; crop improvement; weed control; beef cattle grazing investigations; and forages.

Experiment fields and irrigation development farms
The Kansas Agricultural Experiment Station includes 11 experiment fields: Cornbelt (Powhattan), North Central Kansas (Belleville), Irrigation (Scandia), Sandyland Irrigation and Dryland (St. John), South Central Kansas (Hutchinson), Harvey County (Hesston), East Center (Ottawa), and Kansas River Valley Irrigation (Rossville, and Silver Lake).

Affiliated agencies
Kansas Water Resources Research Institute
Cooperating with the Water Resources Institute, University of Kansas
William L. Hargrove, Acting Director

The Kansas Water Resources Research Institute conducts basic and applied research on water use and to train scientists in water resources. Representatives of K-State and the University of Kansas participate in institute policy making and research. Research is focused on finding the most effective ways of conserving, using, and distributing available water.

Food and Feed Grain Institute
Roe Borsdorf, Director

The Food and Feed Grain Institute has these goals: to develop effective methods of milling and processing grains; to evaluate and improve the quality and nutritional properties of food grains; to find new uses for grains; and to improve the handling, transporting, storing, and domestic and international use of grains and grain food products. Institute scientists are faculty members of the Departments of Grain Science and Industry, Agricultural Economics, Agricultural Engineering, and personnel of agencies such as the U.S. Grain Marketing Research Center.

Center for Applied Statistics
George A. Milliken, Director

Center for Applied Statistics provides consulting services for scientists associated with the Agricultural Experiment Station.

Kansas Center for Agricultural Resources
William L. Hargrove, Director

The Kansas Center for Agricultural Resources and the Environment (KCARE) is an interdisciplinary research and education unit of K-State Research and Extension whose purpose is to provide focus on environmental issues related to agriculture. The center works with faculty from academic departments to provide coordination and support for research and educational activities in natural resources and environmental management. The center also works to garner financial support for programs and serves as a single point of contact for agencies and organizations outside K-State who have interest in natural resource and environmental issues.

Wheat Research Center
Ronald L. Madl, Director

The center supports multi-discipline wheat research programs at K-State. The purpose of the center is to facilitate development of interdepartmental teams to resolve issues facing the wheat industry. The center seeks to expand funding options for wheat programs and serves as a source of information on wheat related topics at K-State.

Plant Biotechnology Center
The Plant Biotechnology Center links scientists in several colleges and departments who use molecular biology and cell and tissue culture to modify the plant genome. The center's mission is to use biotechnology to add quality and value to Kansas products.

The major emphasis is to develop systems, approaches, linkages, and a knowledge base to apply biotechnology to plant improvement. The goals are to enhance yield and product quality for traditional uses, and to explore value-added uses for novel markets.

Projects include activities that are immediately important to Kansas agriculture and that have a high probability of success in a relatively short period of time. They also include a component of basic research that will reach application at a later time.

An important consideration is work on Kansas plants and plant products that could be designed to better meet the demands of national and international markets.

Extension agriculture, natural resources, and community development programs

Daryl D. Buchholz, Assistant Director, Professor

Specialists in several departments of the Colleges of Agriculture and Engineering offer direct educational and technical assistance to citizens throughout the state. In addition, interdisciplinary programs in water quality; resource use and conservation; community and economic development; value-added processing and production; food, feed, and forage production; animal production and utilization; and farm business and financial management are offered.

Agricultural economics
Daniel J. Bernardo, Head

Farm management
Professors Barnaby, Darling, and Fausett; Associate Professors McEowen and Warmann; Assistant Professors Jones, Kastens, and O'Brien; Administrator DeLano; Farm Management Extension Agricultural Economists Allen, Althauser, J. Dawson, R. Dawson, Docken, Everson, Freeze, Herbel, Huschka, Manny, Miller, Roddy, Rogers, Rowell, Schwarzentraub, Smith, D. Stucky, T. Stucky, Thompson, Wahl, Wilken, Witt, and Wood. Emeriti: Professors Schlender and Thomas; Associate Professors McReynolds and Parker; Assistant Professor Overley; Farm Management Extension Agricultural Economists Collins, Dickson, Faidley, Germann, Greene, Hackler, Hageman, and Mullen.

The extension educational program in farm management is divided into two areas: Kansas Farm Management Association programs and area and state farm management programs. In the Kansas Farm Management Association program, the 24 farm management agricultural economists conduct an intensive educational program with approximately 2,700 Kansas farm families in the six farm management associations.

The extension farm management program is conducted by state specialists and area economists. It is done with in-depth educational programs in cooperation with the county extension agents. The area specialists conduct in-depth workshops in farm business management with farm families, provide a nearby reference resource for agents, and develop educational materials for agent use.

Agricultural policy
Professor Flinchbaugh

The public affairs extension educational program provides educational information on policy issues of current interest. Problems are analyzed, alternatives and consequences examined, and the people are challenged to reach decisions.

The economic information program provides current data on factors affecting farming, business and industrial operations, labor supply and demand, and family living costs.

Extension marketing
Professors Barton, Mintert, and Tierney; Emerita: Professor Walker.

The main projects of marketing include marketing information, agri-business, and commodity marketing activities. News releases, monthly teleconferences, publications directed to the general public, and special information directed toward specific agricultural audiences are used to disseminate information.

Extension economic development
Professor Darling.

Extension economic development assists communities in development efforts. News releases, publications, and seminars are offered through county extension agents and area community development specialists.

Extension local government and rural health systems
Assistant Professor Leatherman.

The extension local government programs provide direct educational assistance in the areas of structure, management, finance, and policy.

Extension agricultural engineering
James K. Koelliker, Head
James P. Murphy, State Leader
Professors Harner, Koelliker, Murphy, Powell and Rogers; Assistant Professor Taylor; Emeriti: Professors Black, Clark, Holmes, Jepsen and Wendling.

Extension agricultural engineering conducts an educational program which relates to engineering principles to agricultural concerns including water management, water quality, waste management, food processing, ag safety, pesticide application equipment, and livestock production facilities.

Extension agronomy
David B. Mengel, Head
David A. Whitney, State Leader
Professors Devlin, Fjell, Kilgore, Lamond, Mengel, Ohlenbusch, Peterson, Regehr, Shroyer and Whitney; Associate Professors Duncan and Eberle; Assistant Professor Staggenborg.
Emeriti: Professors Bieberly, Bohannon, and Edelblute.

Extension agronomy conducts a statewide educational program in agricultural crop production and natural resource conservation and protection of natural resources through education and technology transfer that results in improved, stable crop production efficiency. The breadth of the program is in understanding the dynamics of crops, weeds, soils, and water on crop production.

Extension animal sciences and industry
Jack G. Riley, Head
John Smith, State Leader
Professors Brazle, Kuhl, Riley, Schafer, and Spaeth; Associate Professors Arns, Blasi, Bolze, Boyle, Nelssen, Smith and Tokach; Assistant Professors Beyer, Boyle, Marston, and Stokka; Instructor Lee, Emeriti: Professors Adams, Call, Corah, Dunham, Francis, Good, Henderson, Westmeyer, and Zoellner; Extension Assistant Olson.

Extension specialists in animal sciences and industry provide leadership for state programs in beef cattle, dairy cattle, horses, poultry, sheep, swine, meats, dairy products, and wildlife damage control.

Extension community development programs
Emeriti: Professors Frazier and Norby; Associate Professors Halazon, and Sisk.

Extension community development programs help Kansans arrive at group decisions and take actions to enhance their communities as economic, social, service, and living centers. Faculty and major programs in economic development, local government, and land resources are identified in agricultural economics and agronomy programs.

Kansas PRIDE program
Associate Specialist McAdoo.

The Kansas PRIDE Community Improvement Program is a cooperative effort between government, education, and private industry to develop an organizational and leadership structure for community-wide volunteer action. The Kansas PRIDE program is jointly administered by the Kansas State University Cooperative Extension Service and the Kansas Department of Commerce and Housing.

Extension entomology
Sonny Ramaswamy, Head
Randall A. Higgins, State Leader
Professors Bauernfeind, Brooks, Cress, Higgins, Lippert, Mock, Ramaswamy, and Sloderbeck; Emeritus: Professor Gates.

Extension entomology is concerned with integrated insect and mite management or control for Kansas citizens. Pilot pest management projects are used to introduce and validate integrated approaches to managing pest populations.

Extension grain science and industry
Brendan J. Donnelly, Head
Timothy J. Herrman, State Leader
Associate Professor Herrman; Emeriti: Balding, Schoeff, and Wilcox.

Educational efforts target all sectors of the grain industry and include poeple involved with wheat breeding, production, grain handling, merchandising, processing, baking, feed manufacturing, and regulatory compliance. Two thrusts of this program include grain utilization and processing quality; and flour mill, feed mill, and grain elevator management. Subjects include wheat quality as it relates to milling and baking properties, commercial and on-farm grain storage and quality maintenance techniques, on-farm feed manufacturing, commercial feed processing, grain industry safety and regulatory compliance, plant sanitation, food safety, and grain grading.

Extension horticulture, forestry, and recreation resources
Thomas D. Warner, Head
Charles W. Marr, State Leader
Professors Marr, MOrrison, and van der Hoeven; Associate Professor Barden, Gast and Stevens; Assistant Professor Keeley; Emeriti: Leuthold.

Programs in extension horticulture and landscaping serve persons interested in fruits, nuts, vegetables, flowers, turf, shrubs, ornamental and shade trees, and forest and riparian management.

Extension plant pathology
Fred W. Schwenk, Head
Douglas J. Jardine, State Leader
Professors Schwenk and Tisserat; Associate Professors Bowden, and Jardine; Instructor O'Mara; Emeriti: Professors King and Willis.

Plant pathology extension specialists provides information about the occurrence and nature of plant diseases and the economic means for their control.

Extension family and consumer sciences

College of Human Ecology
Professors Bowers, Clarke, Murray, Penner, Smith, Strauss and Walker; Associate Professors Bradshaw, Jones, Mark, Munson, Peters, Phillips, Price, Wilker, and Young; Assistant Professors Bode, and Olsen; Instructor Curry; Emeriti: Professors Anderson, Carlson, Ellithorpe, Neufeld, Slinkman, and Tucker; Associate Professors Appleby, Atkinson, Clonts, Howe, Schroeder, and Wells; Assistant Professors Guthrie, Miller, and Starkey.

Educational programs designed to link education with life experience to improve the lines of individuals, families and communities are conducted through extension programming. Specialists serve as faculty members in two departments (clothing, textiles, and interior design; foods and nutrition) and the School of Family Studies and Human Services within the College of Human Ecology.

Program emphases include promoting health and safety, strengthening relationships, and building community. All programs utilize available research bases and local community wisdom in order to focus work on the most crucial issues affecting Kansas families. Example programs include food safety, parent mentoring, nutrition and chronic disease, gerontology resources, seat belt usage. domestic violence, adaptive clothing and housing, and indoor air quality.

Extension expanded food and nutrition education program
EFNEP is a nutrition education program for limited-resource families. Paraprofessionals under the supervision of extension family and consumer sciences agents conduct individual and small group lessons to help families improve dietary quality. The program is available in designated counties and its special curriculum is available for any county extension family and sciences agent in the state.

4–H youth programs
Gary W. Gerhard, Assistant Director and State 4–H Leader
Professor Fisher; Associate Professors Adams, Fultz, Gerhard, and McFarland; Associate Specialist Lindquist; Emeriti: Professors Apel, Bates, Busset, Eyestone, and Redman; Associate Professors Borst, Salmon, and Whipps; Assistant Professor Weaver.

Kansas 4–H, Kansas' largest youth education apart from the public schools, is the pre-college-level education program of the university, conducted in cooperation with County Extension Councils and the United States Department of Agriculture.

4–H specialists staff and county extension agents interpret, extend, and encourage the application of relevant and current information to concerned adults, parents, and community leaders on techniques of working with children and youth so that the children and youth will become self-directing, contributing members of society. Programs help children and youth build self-confidence, develop inquiring minds, learn to make decisions, relate to others, and develop a concern for the community and those in it.

Services and facilities

Communications

R. R. Furbee, Head
Professors Atkinson, Brandsberg, Frank, and Terry; Associate Professors Baker, Furbee, and Ward; Coordinator Jackson; Specialists Baldwin, Barrett, Brown, Hartman, Havenstein, Holcombe, Kepka, Knapp, Kolawik, McAlavy, Morin, Peterson, Pryor, Snyder, Stadtlander, Tetschner, and Wright; Emeriti: Professors Burke, Graham, Medlin, Thomas, Titus, and Unruh; Associate Professors Buchanan, Jorgensen, McGlashon, and Peck; Assistant Professors Kuehn and Tennant.

The Department of Communications supports K-State Research and Extension and the College of Agriculture with emphasis on the media and computer-based information technology. Information is channeled through newspapers, magazines, publications, circulars and posters, printed annual reports, exhibits, slides, computers, radio, and television. Editing, printing, graphics, slides, distribution, and multi-media services are available.

Included in the Department of Communications is the Weather Data Library and KKSU, an institution-owned public radio station on the air at 580Hz. The K-State Radio network is both a live and audiotape service to Kansas commercial radio stations. Television programs are presented on cooperating television stations, provided for extension agents and specialists, and delivered via satellite videoconferences. Support is provided for the College of Agriculture and K-State Research and Extension personnel for their use of computer-based information technology to deliver educational programs and communicate with each other electronically.

Extension field operations

Southwest Area Office
Paul Hartman, Area Extension Director
Professors Sloderbeck and Thompson; Associate Professor Young; Assistant Professor Alam; Instructor Addison; Director Hartman; Emeriti: Professor Mann; Assistant Professor Blankenhagen.

Northwest Area Office
Reba White, Area Extension Director
Associate Professors Bolze and O'Brien; Assistant Professor Barker; Instructor Curry; Director White; Emeriti: Assistant Professor Mikesell and Overley.

South Central Area Office
J. D. McNutt, Area Extension Director
Professor McNutt; Associate Professors Duncan, Phillips, and Warmann; Emeriti Professors Cox and Van Meter; Associate Professors Albright and McReynolds.

Northeast Area Office
James L. Lindquist, Area Extension Director
Associate Professors Dhuyvetter, Mark, Tokach; Assistant Professor Staggenborg, Instructor White-Huling; Director Lindquist; Emeriti: Professors Figurski, Francis, and Newsome; Associate Professor Utermoehlen.

Southeast Area Office
Benny S. Robbins, Area Extension Director
Professors Brazle, Fausett, Kilgore, Lippert, and Robbins; Associate Professor Price; Instructor Domsch; Emerita: Associate Professor Appleby.

County extension offices

There are extension offices in each of the 105 counties.

Graduate Faculty

ADAMCHAK, DONALD J., Prof. of Sociology (1978). BA 1973, Ohio U.; MA 1975, Western Kentucky U.; PhD 1978, Bowling Green St. U.

ADAMS, WILLIAM J., Asst. Prof. of Journalism and Mass Communications (1985). BA 1976, Brigham Young U.; MA 1980, Ball St. U.; PhD 1988, Indiana U.

AKINS, RICHARD G., Prof. of Chemical Engineering (1963). BS 1957, MS 1958, U. of Louisville; PhD 1963, Northwestern U.

AKKINA, KRISHNA RAO, Assoc. Prof. of Economics (1972). BA 1963, U. of Andhra; MA 1965, Delhi School of Economics; PhD 1972, U. of Minnesota.

AL-KHATIB, KASSIM, Asst. Prof. of Agronomy (1996). BS 1971, MS 1977, U. of Baghdad; PhD 1984, Kansas State U.

ALEXANDER, LOREN R., Emeritus Asst. Prof. of Modern Languages (1965).

ANDERSON, CATHY L., Assoc. Prof. of Speech; Women's Studies (1980). BA 1974, Lyndon St. Col.; MFA 1980, U. of Connecticut.

ANDRESEN, DANIEL, Asst. Prof. of Computing and Information Sciences (1997). BS 1990, Westmont College; MS 1992, California Polytechnic State U.; PhD 1997, U. of California.

ANDREWS, GORDON, Asst. Prof. of Pathology (1992). BS 1975, Cornell; DVM 1984, Oklahoma St. U.

ANDRUS, DAVID M., Head and Prof. of Marketing and International Business (1983). BS 1976, Oklahoma St. U.; MA 1978, U. of Hawaii; PhD 1981, U. of Iowa.

ANDRUS, LYNDA, Asst. Prof. of Art (1983). BFA 1978, U. of Hawaii; MA 1979, MFA 1981, U. of Iowa.

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ARNDS, PETER, Asst. Prof. of Modern Languages (1995). MA 1990, Ludwig Maximilians U. of Munich; PhD 1995, U. of Toronto.

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BABCOCK, MICHAEL W., Prof. of Economics (1972). BS, BA 1967, Drake U.; MA 1969, PhD 1973, U. of Illinois.

BAGBY, LAURIE, Asst. Prof. of Political Science. BA 1985, MA 1987, PhD 1990, Northern Illinois U.

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BARKLEY, ANDREW P., Prof. of Agricultural Economics (1988). BA 1984, Whitman Col., Wash.; MA 1986, PhD 1988, U. of Chicago.

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BARTON, DAVID G., Prof. of Agricultural Economics (1976). BS 1967, Utah St. U.; MS 1970, PhD 1974, Purdue U.

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BAURES, PAUL W., Asst. Prof. of Chemistry (1997). BS 1985, Winona State U.; MS 1988, PhD 1995, U. of Minnesota.

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BERGEN, LORI, Asst. Prof. of Journalism and Mass Communications (1994). BS 1981, MS 1983 Kansas State U.; PhD 1991, Indiana U.

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BHANDARI, ALOK, Asst. Prof. of Civil Engineering (1998). BS 1990, Jawaharial Nehru Technological U.; MS 1992, PhD 1995, Virginia Polytechnic Institute and State U.

BIERE, ARLO W., Prof. of Agricultural Economics (1968). BS 1963, U. of Nebraska; MA 1967, PhD 1968, U. of California.

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BISSEY, CHARLES R., Prof. of Architectural Engineering (1969). BS 1957, Colorado St. U.; MArch 1961, Kansas St. U.; Professional Engineer, 1979.

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BLECHA, FRANK, Interim Head and Prof. of Anatomy and Physiology; Prof. of Animal Sciences & Industry; Research Stress Physiologist (1981). BS 1971, MS 1977, U. of Idaho; PhD 1981, Washington St. U.

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BREDE, RICHARD M., Asst. Prof. of Sociology (1971). BA 1962, MS 1964, U. of Oregon; PhD 1971, U. of Illinois.

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BROOKS, KENNETH R., Prof. of Landscape Architecture (1982). BS 1974, Colorado St. U.; MLA 1977, Utah St. U.; Registered Landscape Architect.

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BURCKEL, ROBERT B., Prof. of Mathematics (1971). BS 1961, U. of Notre Dame; MA 1963, PhD 1968, Yale U.

BURDEN, PAUL R., Prof. of Education (1980). BS 1970, MS 1973, Buffalo St. Col.; PhD 1979, Ohio St. U.

BURTIS, JOHN O., Assoc. Prof. of Speech (1991). BA 1977, Kansas St. U.; MA 1979, Kansas St. U.; PhD 1987, U. of Minnesota.

BURTON, CHARLES L., Prof. of Architectural Engineering, Construction Science (1970). BS 1963, Kansas St. U.; MS 1975, U. of Kansas; Professional Engineer, Kansas, 1970.

BURTON, ROBERT O., JR., Prof. of Agricultural Economics (1984). BS 1969, MS 1977, Virginia Poly. Inst.; PhD 1982, Purdue U.

BUSCHMAN, LAWRENT L., Assoc. Prof. of Entomology; Research Entomologist, Corn Insects, SW Research-Extension Cntr. (1981). BA 1964, Tabor Col.; MS 1968, Emporia St. U.; PhD 1977, U. of Florida.

BUSSING, CHARLES E., Emeritus Assoc. Prof. of Geography (1964). BA 1959, Northern Col. U.; MA 1961, U. of Colorado; PhD 1969, U. of Nebraska.

BUSZEK, KEITH R., Assoc. Prof. of Chemistry (1990). BS 1980, U. of California–Irvine; PhD 1987, U. of California–Los Angeles.

BYARS, JACKSON A., Asst. Prof., Education (1969). BA 1959, Municipal U. of Omaha; MA 1964, Colorado St. Col.; PhD 1970, U. of Nebraska.

BYRNE, DAVID R., Prof., Education (1984). BA 1959, Idaho St. U.; PhD 1971, U. of Utah.

CABLE, TED T., Prof. of Forestry; Asst. Prof. of Biology (1984). BS 1974, U. of Illinois–Chicago; MS 1980, PhD 1984, Purdue U.

CALHOUN, MYRON A., Prof. Emeritus of Computing and Information Sciences (1971). AA 1961, Graceland Col.; BS 1963, U. of Kansas; MS 1964, Colorado St. U.; PhD 1967, Arizona St. U.

CALLUORI HOLCOMBE, ANNA, Head and Assoc. Prof. of Art (1994). BA 1974, Montclair St. College; MFA 1977, Louisiana St. U.

CANTER, DEBORAH D., Prof., Hotel, Restaurant, Institution Management and Dietetics (1977). BS 1972, MS 1974, PhD 1977, U. of Tennessee.

CARNES, KEVIN, Asst. Research Prof. of Physics (1984). PhD 1984, Purdue U.

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CARPENTER, KENNETH H., Prof. of Electrical and Computer Engineering (1986). BS 1961, MS 1962, Kansas St. U.; PhD 1966, Texas Christian U.

CASH, WALTER C., Prof. of Anatomy & Physiology (1974). DVM 1971, PhD 1982, Kansas St. U.

CASHIN, WILLIAM E., Dir. Emeritus of Cntr. for Faculty Evaluation and Dev. (1975). BA 1958, MA 1961, PhD 1969, Catholic U. of America.

CASSOU, STEVEN P., Assoc. Prof. of Economics (1996). AB 1982, U. of California; PhD 1989, U. of Minnesota.

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CHANG, SHING I., Asst. Prof. of Industrial and Manufacturing Systems Engineering (1991). BS 1983, Tsing Hua U.; MS 1987, Arizona St. U.; PhD 1991, Ohio St. U.

CHANG, YANG-MING, Assoc. Prof. of Economics (1984). MA 1978, Nat. Taiwan U., Taipei; PhD 1984, SUNY, Buffalo.

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